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Winter semester 2014/2015

Students' media use and multitasking behavior in class: Perspectives of university instructors about its impacts on the educational environment

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Date: 03.11.14

urn:nbn:de:gbv:ilm1-2016200025

Abstract

This study investigates university instructors' attitudes in cognitive, affective and behavioral terms towards students' media use and multitasking behavior in class. A mixed methods strategy was adopted, in which data was gathered via interviews in the qualitative phase that informed the survey, used as instrument in the quantitative phase. The findings illustrate aspects instructors consider being positively and negatively impacted by students' media use behavior, showing that most instructors have favorable implicit and behavioral attitudes towards the event. Pearson correlation coefficient tests demonstrated implicit attitudes were correlated to instructors' familiarization to media devices and use of lecture. This study provides an update of nowadays' picture of teaching in universities, contributing for the achievement of a more adequate education system for both learners and educators.

Zusammenfassung

Diese Studie untersucht die Einstellung von Hochschuldozenten zur Mediennutzung und zum Multitasking-Verhalten von Studierenden im Unterricht in kognitiver, affektiver und verhaltensrelevanter Hinsicht. Es wurde eine Strategie der gemischten Methoden angewandt, in der durch Interviews in der qualitativen Phase Daten zur Herausarbeitung der Umfrage gesammelt wurden. Diese diente dann als Instrument in der quantitativen Phase. Die Resultate veranschaulichen Aspekte, die die Dozenten als positiv oder negativ beeinflusst durch das Mediennutzungsverhalten der Studierenden erachten. Ebenso wird eine wohlwollende innere Einstellung und Verhaltensweise der meisten Dozenten hinsichtlich dieser Tatsache deutlich. Der Pearson'sche Korrelationskoeffizienztest zeigte, dass die implizite Einstellung mit der Einarbeitung der Dozenten in die Arbeit mit Medien und deren Nutzung in Vorlesungen korrelierte. Die Studie verschafft einen aktuellen Einblick in das zeitgenössischen Lehren an Universitäten und soll zur Erreichung eines angemesseneren Bildungssystems sowohl für Lernende als auch für Lehrende beitragen.

Acknowledgements

Doing a master program in Germany might be an ordinary happening for many people, but not for me. This was a dream that for some years seemed very far from coming to reality, and demanded work, savings, persistence and courage.

Thus, presenting this thesis is a meaningful step for me, and I would like to take the opportunity to express my thankfulness:

To God, if I have arrived until here and I am not anymore where I used to be, it is because He allowed me to. He is the one who provides what I need and gives me strength when I do not have any left;
To Naídes, the most beautiful person I have met in this world, and whom I have the privilege to have as mother; for always believing in me and wanting my happiness;
To my supervisor Prof. Dr. Jens Wolling; for being a present advisor, showing interest, patience, and encouragement;
To my second supervisor Dr. Christoph Kuhlmann, for giving valuable contributions during the process of this thesis;
To my siblings Artur and Adriana, and my friends Ana Júlia and Lóide, who even physically far, have been so present, supporting me and cheering me up;
To my classmates, who became dear friends, Yusra, Wany and Yi; for the "peer therapy sessions", valuable talks and fun moments;
To my friends Maria and Michael, for adopting me as family in Ilmenau, giving me support in many ways, and making me feel home;
To my friend Paula, who encouraged and help me to come to Ilmenau for the master.

My sincere gratitude,

Priscila Berger.

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1 Introduction

The space portable media devices have been occupying in people's lives is remarkable. A great part of a person's day is spent with online activities for work, study, entertainment, communication and socialization. Laptops became a very personal item present in different parts of people's lives, and nowadays with even more portable devices, as smartphones, tablets and wearables, people have the chance to be connected virtually everywhere, all the time, creating a very personal relationship with these media devices.

From the media side, the intense use of mobile devices and media multitasking are trends in terms of behavior, especially among youth (Foher, 2006). These behaviors in classrooms definitely bring implications to the education system, therefore studies have been conducted focusing on the impact they have on learning, exploring the perspective of the student (Lauricella & Kay, 2010; Hastall et al, 2012; Sana et al, 2013). However, the teaching position cannot be ignored. All what media devices may represent to a student in a classroom - distraction, resource for classes, source of information, etc., may impact somehow the job of the instructor.

From the education side, in the past, a teacher in a classroom was commonly seen as the source of knowledge and the authority in that environment (Lima, 1996). As society changes, new approaches to education come, with the proposal of maintaining a more dialogical relationship with students (Freire, 1983), valorizing their experience and knowledge and attempting to nurture a learning environment where students and instructor are on a more similar level.

As laptops grew in popularity and students started bringing their computers to their classes, some instructors reacted very strictly against the use of these devices by students during the classes (Yamamoto, 2007). Mobile technology has been developing and becoming more and more popular and adopted by users, presenting itself as a strong trend which might be hard to forbid in a classroom environment. However, instructors' might still have difficulties to accept the presence of media in

class and the implications it brings. For this reason, it is worth investigating what are the attitudes of instructors nowadays towards the vast set of mobile devices that go with students to and are used by them in class, thus updating nowadays' picture of how it is like to teach a generation with such an intimacy with their media devices in universities.

As aforementioned, most studies on media use and media multitasking in classrooms examine the learners' side. Definitely it is highly relevant to understand how students learn in order to achieve more efficient education environments; nevertheless, as education environments also consist of teaching, it is worthy verifying how this side of the process perceives media use behavior impacts. Certainly the impacts on students' learning can be considered also an implication to teaching, however there might be further aspects impacted in the instructor's position.

Furthermore, when it comes to teaching, studies and publications offer recommendations to instructors, discussing the necessity to adapt pedagogy to fulfill the needs of this digital native generation of learners. Those recommendations are based mainly on the implications media use and multitasking brings for the students' learning, though. Therefore it is relevant to examine the perspective of educators in face of their students' media consumption in class in order to understand better the necessity to whether adapt teaching methods and learning environments.

Moreover, it is pertinent to verify the impact the trendy media use and multitasking behavior of students in class has on teaching according to instructors' appraisals because of the emotion load that is involved in the teaching activity, as research in emotional labor suggests "unpleasant classroom emotions have considerable implications for student learning, school climate and the quality of education in general" (Schutz & Lee, 2014, p. 173).

Hence examining more attentively the instructors' side and the implications to the education environment perceived by them is a valuable complement to the purpose of adjusting and improving classrooms dynamics to achieve a more adequate education system for both learners and educators.

The goal of this two-phase, exploratory sequential mixed methods study is to comprehend university instructors' perspective of the impact students' media use and multitasking behavior in class has on the educational environment. For this purpose, it is intended to investigate instructors' attitudes in cognitive, affective and behavioral terms towards students' media use behavior in class in the different aspects impacted by this phenomenon in the classroom environment. Thus, it is expected to understand better the factors most impacted in the teaching perspective, either in a positive or negative way. Besides this, it is intended to verify which instructors' characteristics influence those appraisals to be either favorable or unfavorable.

The first phase consists of a qualitative exploration of instructors' ideas, feelings and behaviors concerning the impact of their students' media use and multitasking behavior during classes by conducting semi-structured interviews with university instructors. Findings from this initial qualitative procedure were then used to inform the subsequent phase, in the sense of providing input to the development of the survey questionnaire. Qualitative data was collected first in order to complement the guiding theory, which was found little.

The quantitative phase verifies the prevalence of the findings concerning implications seen by instructors and their attitudes regarding students' media use and multitasking in classrooms, besides testing hypotheses that relate instructors' favorable and unfavorable attitudes with personal and professional characteristics, namely generation, familiarization with media devices, experience in teaching, and pedagogic approach.

The following chapter will present the theories and previous studies conducted in the area, which were reviewed and served as basis for this investigation. In the sequence, the research questions and hypotheses that compose this research are posed.

Chapter 3 clarifies how this study was designed and conducted in its different steps. In the fourth chapter the results of the qualitative and quantitative phases are presented and analyzed. Finally, a discussion on the findings, followed by the limitations of this work, and suggestions for further research conclude this study.

2 Theoretical framework

2.1 Media multitasking behavior: a trend in and out classrooms

Today's technology consists of sets, devices, systems and platforms that simply lead to multitasking due to their characteristics - one single set permits the performance of many different activities, besides being portable and handheld. Sets such as computers and smartphones work as gateways to various media, which permits easily media multitasking, that is understood as "person's consumption of more than one item or stream of content at the same time" (Ophir, Nass, & Wagner 2009, p. 15583).

In terms of educational environments, it is assumed that students attend lectures to engage in the activities proposed in class, as described by Sana, Weston and Cepeda (2013) "the presumed primary tasks in many university classes are to listen to a lecture, consolidate information spoken by the instructor and presented on information slides, take notes, and ask or respond to questions" (p. 25). Consequently, when students are using devices such as laptops and smartphones in class, they may be engaging concurrently in other activities, for instance checking e-mails, using instant text message programs, acting on social networks, etc. Thus the situations when students alternate personal activities in their devices with the activities proposed in class are considered multitasking behavior in this study.

Studies confirm media multitasking as a general trend in audiences by showing the prevalence of its occurrence, affirming it has become a popular phenomenon, a prevalent audience behavior and sometimes even a way of life (Foher, 2006; Lui & Wong, 2012; Jeong & Hwang, 2012). The study conducted by Voorveld and Van der Goot (2013) analyzed self-reports of media use of seven age groups, in a total of 1783 participants between 13 and 65 years old, and concluded that "media multitasking is a phenomenon that is not reserved for young people: all age groups spent more than an hour a day on media multitasking" (p. 403).

Data concerning classrooms confirm multitasking as a very strong trend also in education environments. The study conducted by Hastall, Reich, Vorderer and Roth (2012) on the prevalence of multitasking in classrooms surveyed 396 German university students, and found out that, in average, approximately a third of lecture time is spent with non academic activities. They verified that among the activities conducted during lecture time, writing/reading messages on the phone, checking e-mails and social networks, and surfing the web are some of the common actions indicated by the students in class.

Another study that surveyed over 500 university students about their laptop use during classes came to the following numbers:

> Over 70% of students spent up to 50% of class time sending non-academic email messages. Fifty-six percent of students exchanged instant messages up to 50% of the time during class, thirty-one percent of students spent over 50% of class time instant messaging (Lauricella & Kay, 2010, p. 158).

As aforesaid, technology gives conditions for media multitasking, therefore some people may multitask unintentionally, simply because the media-saturated environments where they are inserted lead to this. On the other hand, some people do recognize gratifications in media multitasking, and these gratifications associated to the conditions conduct to multitasking.

The main perceived gratification of multitasking has to do with time (Tokan & Matilla, 2011). By multitasking, people perceive they are using their time in a more practical and efficient way. For instance, gaps in the flow of activities associated to the opportunity of performance of concomitant activities that computers and other sets offer are great impellers of multitasking in order to optimize time.

Furthermore, some people see an emotional value by perceiving in media multitasking a way to fight boredom, loneliness and impatience (Tokan & Matilla, 2011), which goes in line with the findings of Hastall et al (2012), that present boredom and lack of interest in the class as the main reasons for university students to multitask with media in class. In addition to this, some people consider it fun and productive the possibility of, regardless where they are, having access to work, study,

leisure and socialization environments at the same time (Bardhi, Rohm, & Sultan, 2010).

Generally, it can be understood that the reasons that lead to multitasking can be explained as an association of motivation, that is, internal factors driven by gratifications perceived; and opportunity, that is, external factors driven by an environment with a great offer of media and technology (Foher, 2006). Multitasking with media is a trend clearly observed in current university classrooms, although the studies on prevalence of media multitasking on university classrooms (Lauricella & Kay, 2010; Hastall et al, 2012) use the survey as method of gathering data, whilst other studies on prevalence of media multitasking also used diaries analysis (Foher, 2006; Voorveld & Van der Goot, 2013), which can be more precise, since when people answer surveys they report to their perceptions, and in diaries they register the actual fact. Therefore, if studies could assess more accurately what students are doing on their media devices during classes, the diagnosed prevalence of media multitasking could be even higher.

2.2 Effects of media use and multitasking on learning

An important differentiation is made by Jeong and Hwang (2012) between multitasking and mere distraction. They affirm that multitasking involves distraction, however multitasking goes beyond because it implicates dual and complex message processing, involving loads of cognitive resources, and at some point the performance of each task is harmed because of an excessive demand, as evidenced in the experiment conducted by Lee, Lin and Robertson (2012): "Tasks that require focused attention like studying suffer when students engaged in other activities at the same time" (p. 101). The experiment had 130 participants and compared the performance in assimilating content in three different situations: only reading, reading with video playing on the background, and reading and watching video simultaneously as sources of information.

Many studies consider the main impact of multitasking on attention and memory, basing on theories from cognitive psychology to assume that when it comes to media

use, it is not possible to multitask efficiently, that is, when one is consuming more than one stream of content at the same time and using loads of cognitive effort, one of the concomitant tasks will suffer impairment. Some theories used from this field are: (1) The Limited Capacity Model (Lang, 2000), which says a person's ability, that is, mental resources, to process information is limited; and (2) The Resource Allocation Theory (Kanfer & Ackerman, 1989), which affirms that the human brain has finite cognitive abilities to attend to multiple tasks simultaneously.

Hence, applying these theories to the analysis of multitasking situations, individuals would use a greater part of their resources to process the information of the primary task, and the secondary task would consequently suffer some sort of impairment in encoding.

When multitasking with media in class, another aspect brought to consideration by some scholars is the false feeling of full attention that the multitasker may nurture, as Glen observes in his article about attention during class:

> A student today who moves his attention rapid-fire from text-messaging to the lecture to Facebook to note-taking and back again may walk away from the class feeling buzzed and alert, with a sense that he has absorbed much more of the lesson than he actually has (2010, p. 1).

Besides the power that media devices have to distract the focus of attention of their users in classrooms, even students who are not using media devices in class may get distracted by their classmates' media use behavior, as Sana et al (2013) found in their experimental study simulating a classroom lecture that "comprehension was impaired for participants who were seated in view of peers engaged in multitasking, (…) despite actively trying to learn the material (…), these participants were placed at a disadvantage by the choices of their peers" (p. 29).

Hayles (2007) argues that the saturated media environment where young people have grown up is probably the main factor that is leading to a shift of cognitive modes, from traditional deep attention to hyper attention. Basically, the first has the emphasis in one single task, prioritizing a single information stream; whilst the latter alternates focus quickly among tasks and prefers multiple sources of information and stimuli.

When it comes to educational institutions, Hayles (2007) considers that they have specialized in creating environments for deep attention, which conflicts to the cognitive mode set in hyper attention that is becoming more and more common among students. Therefore, an incompatibility between students and instructors might arise, causing students to feel bored and instructors to feel frustrated.

In order to solve this gap, the two possibilities are either changing the students to adequate to the teaching style, or changing the education environment according to students' new needs (Prensky, 2001; Hayles, 2007). Notwithstanding Prensky warns that "it is highly unlikely the Digital Natives will go backwards (…) their brains may already be different" (2001, p. 3).

The studies on the effects of media multitasking on learning (Lee et al, 2012; Sana et al, 2013) base their conclusions on results of tests which assess the assimilation of content in a situation especially fabricated for the experiment, with the conditions of multitasking imposed, which may not represent the effect of spontaneous multitasking in a real class. Furthermore, the studies on effect of multitasking focus on the impact on learning, that is, on the impact on the multitasker, and pay little attention on the impact this behavior brings to the environment in general where multitasking is performed.

2.3 Repercussions of media multitasking in classrooms for teaching

The students who are currently attending university, mostly close to or in their early twenties, belong to the so-called Net Generation – a group of people who were born after 1980 (Tapscott, 2009), and grew up while all sorts of environments were being computerized quickly. Along with that, laptops have become cheaper and lighter, which contributed to more people having their own device. Concurrently, other portable multifunctional devices such as smartphones, tablets and netbooks were made widely available, reaching more and more users.

These can be considered strong aspects that contributed for the massive penetration of

laptops and mobile devices in university classrooms, as noted by the report of The Economist Intelligence Unit: "Where a notebook and pen may have formed the tool kit of prior generations, today's students come to class armed with smartphones, laptops and iPods" (2008, p. 5).

These devices are gateways to a variety of media and offer diverse options of communication, characteristics that permit their owners to be connected to the world outside the classrooms continuously. Thus, "students receive texts, tweets, instant update notifications, and email on their smartphones throughout the day" (Grinols & Rajesh, 2014, p. 1), which might pose a challenge to instructors in engaging their students sufficiently to develop the proposed activities in class. The fact is that the invasion of laptops and mobile devices in classrooms happened quickly and many university instructors might not have taken the time to adapt to it or even to analyze the implications it brings to the dynamics of their classrooms.

Scholars from varied fields, such as Education, Communication, and Technology, have been turning attention to the presence of media devices in classrooms. The studies that have been conducted to verify the impact of laptops and media devices in class, and scholars who analyze the phenomenon broach implications mainly to students' learning. Basically there are two positions: (1) the ones who see media in class as a sheer source of distraction, harming attention and memory (Hembrooke & Gay, 2003; Fried, 2006; Yamamoto, 2007; Grinols & Rajesh, 2014); and (2) the ones who see in it a trait of the young generation that cannot be ignored, instead must be dealt properly with in order to benefit from it (Prensky, 2001; Hayles, 2007; Tapscott, 2009).

2.4 Perceptions about the presence of media in classrooms

Studies affirm that laptops and mobile devices with Internet access represent a major source of distraction when students multitask with them in class, impairing attention (Hembrooke & Gay, 2003; Fried, 2006; Yamamoto, 2007; The Economist Intelligence Unit, 2008; Lee et al, 2012; Grinols & Rajesh, 2014), not only of their owners - the multitaskers, but also of the students around (Sana et al, 2013), and

therefore are harmful to learning.

It is crucial to admit that media use in class is not the only possibility of multitasking. Students have many opportunities of distraction and multitasking during class, for instance note passing, talking to classmates and doing tasks related to other classes (Hembrooke & Gay, 2003). However, laptops and other mobile devices, such as smartphones, tablets and netbooks, due to their capability of giving access to a diversity of media, are great impellers of parallel activities, according to Hembrooke and Gay, they "have the potential to bring distraction to new heights" (2003, p. 2).

Yamamoto (2007) wrote a paper especially to encourage the ban of laptops in classrooms, setting forth a series of arguments justifying why he adopted this policy in his classes and making an account of his experience as a university instructor. Some of the negative aspects pointed by him are that the presence of laptops in classrooms leads to poor note taking skills, as students merely transcribe and do not think deeply about what they are listening to from the instructor.

Moreover, he observes it creates a physical and mental barrier between instructors and students in class, making it difficult for the instructor to identify whether the students are in line with the proposed activities or not. He considers this harms the control of the teacher over the classroom, and turns the classroom in an impersonal environment, in which the instructor has difficulties to get clues if the students are following the ideas and activities presented, and therefore may have problems to determine the appropriate pace in which the class should develop. By adopting the laptop ban in his classes, he affirms that one of the positive outcomes was that students asked more questions in number and in depth, that is, their engagement in class activities was better.

Sana et al (2013) comment that the access mobile devices give to so varied online sources of entertainment makes it hard for instructors being interesting, attractive and appealing for winning students' attention.

The article written by the senior reporter David Glen (2010) gathers statements and impressions of scholars and instructors about media multitasking in classrooms,

presenting some other examples of the concern and actions of university instructors towards the presence of laptops and mobile devices in educational environments. Some examples follow the laptop ban: instructors forbid the use of laptop in class, but distribute or make available the class material online for students; others assign a special row in the classroom for the laptop users, so at least they do not distract other classmates; and even some instructors allow the use of laptops in class despite admitting to feel uncomfortable with it because they believe it would be unacceptable to ban it, since we are a computerized society.

Other ways pointed to handle laptop presence in classrooms are disabling Wi-Fi signal in the classroom; moving around the class during lecture time; posing rules for laptop use, for example, strictly for note taking (Yamamoto, 2007); and limiting the media use in occasions of introduction of new material and subjects (The Economist Intelligence Unit, 2008; Lee et al, 2012).

On the other hand, there are positive views about the presence of laptops and mobile devices in classrooms. Tapscott urges educators to "bring their classes to the 21st century" (2009, p. 123), which is characterized by massive media sets, connecting people and spreading information in real time, nonstop. Therefore, he argues a 21st century classroom cannot lock the media sets out and ignore students' media use necessities.

Furthermore, studies (Tapscott, 2009; Norris, Hossain & Soloway, 2011; Sana et al, 2013) affirm that the effect of media devices in classrooms depends on the way they are introduced and involved in the environment. According to Norris et al (2011), there is a difference between inserting computers in classroom as a supplemental tool, and using it as an essential resource. In the first case, computers are simply present in a class that basically follows a conservative curriculum; in the latter computers are actively used in class, stimulating active and personalized learning.

Despite recognizing the potential to distract students in class, the report of The Economist Intelligence Unit is positive concerning the impact of technologies in class on teaching methodologies, affirming that instructors will need to adapt to technology, incorporate it and take advantage of its dynamics: "Instead of focusing on

memorization of material by their students, instructors will focus on the application of knowledge to particular problems" (2008, p.6).

This suggests that the use of mobile devices in class has the potential of being a link between the classroom and the "real world". Allegedly what is taught in the classroom relates to and aims to be applied on practical situations. Mobile devices provide this instant connection to the world through the search of information, visits to virtual places, and also through recording videos and taking pictures, so that students are able to bring to the classroom pieces of the reality outside (Grinols & Rajesh, 2014).

In summary, when it comes to the implications media use and multitasking in classes bring to teaching, scholars set forth arguments usually based on the studies about the effect it has on learning, therefore making recommendations on how instructors should position themselves in the education environment with the students and their intense media use habits. The recommendations either encourage instructors to welcome this behavior in class and adapt the environment to embrace this trait, considering it an irreversible process; or make explicit all the negative effects it brings to the education environments, discussing possible ways to control it. Although positions are split, most studies discuss the bad side and attempt to find a solution for it.

However, only few materials bring actual statements by instructors, like Yamamoto (2007) that accounts exclusively his own experience, and the journalistic report by Glen (2010) that gathers a few instructors' declarations. This evidences a scarcity in studies that investigate closely the teaching position concerning media in classrooms, which is necessary to be explored together with the learning perspective in order to understand how media use and multitasking in classrooms are shaping education environments.

2.5 Instructors VS media devices in education environments

The positions of scholars, institutions and instructors towards students' media use and media multitasking in class are either favorable or unfavorable, considering different aspects. As multitasking with media devices is a growing trend among youth in general (Foher, 2006) and in university classrooms (Hastall et al, 2012), it can be assumed that it is more difficult to sustain a strong opposition to the phenomenon, for example establishing a laptop ban in a classroom, since computers and mobile devices are getting exponentially more accepted in all spheres of society (Glen, 2010).

Nevertheless it does not necessarily mean that because mobile devices are more accepted in classes nowadays, instructors feel at ease with the situation. Thinking of a classroom in the 90's, when devices such as portable video games were already popular, it would be hard to imagine that an instructor would allow their students to use it during class time. Current mobile devices and laptops are inserted in society in a different way, these devices are seen as highly functional and necessary, although their functions also include entertainment.

Besides this, the figure of the instructor also has been facing changes throughout education history. For a long time, education was centered on the teacher and on texts, in mainly expository classes (Lima, 1996); and, knowledge and information were relatively scarce, that is, the number of experts in determined fields was much lower in comparison to the ones seeking for obtaining that knowledge. This proportion may still be real, however nowadays content is abundant in the online sphere, and even the experts themselves are more approachable (Weller, 2011). The authority of the instructor in class as exclusive source of information is no longer absolute, and mobile devices contribute to the independence of students, since the web is an endless source of information and also facilitates the contact and collaboration among peers.

Since studies give evidence of the different ways in which Digital Natives function, including in learning, and scholars affirm it is something that cannot be changed (Prensky, 2001; Foher, 2006; Hayles, 2007), it relies more strongly on the instructor the expectations to adapt to the new characteristics of their students, in order to ensure the relevance of their role and their employability (Bayne & Ross, 2007).

An environment where ownership of media devices grows in popularity and media multitasking becomes a strong trend is the scenario where instructors need to develop their teaching activities nowadays. How they are doing this, to what extent they are adapting to students' new characteristics and habits, that is, which actions they are taking to deal with the presence of media in university classrooms, result from their opinions and feelings about it, how they understand media impacts their classes. The overt actions are products of implicit perceptions, what constitutes the concept of attitudes. Thus, examining the attitudes of university instructors regarding students' media use in class must consider different aspects that will be clarified in the next section.

2.6 Instructors' attitudes towards students' media use in class

Attitudes are an extensive field of study in Social Psychology, defined as "learned predispositions to respond in a favorable or unfavorable manner to a particular person, object or idea" (Feldman, 1995, p. 314). According to Eiser (1994), attitudes involve subjective experience and evaluation of an object, and are somehow communicated.

Rosenberg and Hovland (1960) refer to the ways individuals communicate their attitudes as classes of responses to stimuli. According to their Three Component View of Attitudes, these responses towards a stimulus are classified in three major types: (1) affective, which corresponds to positively or negatively evaluative feelings and preferences towards an object; (2) cognitive, corresponding to opinions and beliefs, knowledge and thoughts in relation to an object, explained by Fazio and Olson as "when one comes to believe either that the attitude object possesses (un)desirable attributes, or that the attitude object will bring about (un)desired outcomes" (2003, 141); and (3) behavioral or conative, which consists of overt actions and statements of intent, that is, behavioral intentions in respect or in the presence of the object.

Eiser summarizes the relationship among these three components in the dynamics of attitudes in the following way:

> To say we have a certain attitude towards something or someone is a shorthand way of saying that we have feelings or thoughts of like or dislike, approval or disapproval, attraction or repulsion, trust or distrust and so on. Such feelings will tend to be reflected in what we say and do, and in how we react to what others say and do (1994, p. 11).

Attitudes are inner constructs by nature; therefore an individual's attitude towards a stimulus cannot be thoroughly identified in an objective way. The three component view permits individuals' attitudes to be evaluated through components that can be assessed somehow – thoughts, feelings and behavior concerning the object (Fazio & Olson, 2003).

The fact that attitudes by definition have a favorable or unfavorable character brings to the topic of consistency. Fishbein and Ajzen (1975) affirm that responses are consistent when the individual's evaluations are placed either in the positive or negative side of the dimension. Nonetheless Fazio and Olson recognize that "an individual may possess both positive and negative evaluations of the attitude object. (…) The individual's attitude can be viewed as ambivalent" (2003, p. 142). The Tripartite Model suggests that the three classes of responses should be consistent with each other because they are interdependent in building the attitude (Fazio & Olson, 2003), nevertheless for other scholars, attitudes can derive from any combination of the three components, not necessarily agreeing among them (Zanna & Rempel, 1988).

The study conducted by Schutz and Lee (2014) based on literature review about teachers' emotions, elucidates the instructor's process of judging and appraising a specific event in the classroom. They consider this process happens with basis on the instructor's goals, values and beliefs, which represents where instructors position themselves during classroom activities, for instance how the proposed activity is developing in relation to what the instructor had in mind. This approach connects the favorable or unfavorable appraisals to the instructors' expectations in relation to what really happens in class, that is, how their students accept, develop and accomplish the planned activities.

Schutz and Lee (2014) report these appraisals can be classified as primary and secondary. The former refers to how important instructors perceive the result of the activity to be, involving aspects such as goal relevance and goal congruence; whilst the latter refers to how instructors evaluate their own ability to handle what is happening during the classroom activity, which has to do with feelings of being in control of the situation and confidence in handling occasional problems.

Taking in consideration the components of attitudes (Rosenberg & Hovland, 1960) and the process of appraising classroom events described by Schutz and Lee (2014), this study considers the students' media use and multitasking behavior as the stimulus or the class event, in relation to which the position of instructors is examined.

Depending on the beliefs and values of instructors regarding students' media use in class, instructors will plan activities and create expectations on how those will develop in class and then evaluate its success in relation to what actually happens in class. According to what is explained by Schutz and Lee (2014) "when students are compliant, it confirms pleasant emotions about being respected; when students are defiant, frustration can lead to doubt about emergent teacher roles" (p. 174), it is expected, for instance, that an instructor, who believes students' media use is not relevant or useful to the goals of the class, will not embrace the presence of media when planning the class activities, consequently will expect students not to use them in class, and if students do, it might lead to frustration at some extent.

2.7 Possible influencing factors of instructors' attitudes

Scholars worry for the learning quality in classrooms, whether it is threatened by multitasking with media. Instructors who declare they do not support the use of media in class by students, argue mainly that they are convinced it causes distraction and harms students' performance. Nonetheless it may not be the only reason for some instructors being against media use during classes, and further aspects might be considered in order to understand why some instructors are enthusiasts and others are critics when it comes to students' media use in classes.

Factors such as generation, familiarity with media devices, teaching experience and pedagogic approach are examined as potential influences for instructors to associate media use by students in class either with barriers, discomfort and challenges; or with stimuli and opportunities.

2.7.1 Generations

Although the digital era has been evolving quickly, it is still relatively recent, computers and mobile devices started getting popular in the last three decades, first in institutional, industrial and corporate spheres, followed by people adopting them for private use. Therefore, the ones who were already adults when this phenomenon started probably have a different media experience from the ones who were born after this period or were very young by then and grew up in the computerized era.

In their study about media multitasking among generations, Carrier, Cheever, Rosen, Benitez and Chang (2009) surveyed 1319 people considering the three labels of generations: (1) Baby Boomers, born between 1946 and 1964, (2) Generation X, born between 1965 and 1979, and (3) Net Generation, born after 1980. Concerning media use, Baby Boomers are the ones who have the most experience with analogic and even manual systems in different environments and processes; followed by Generation X.

When it comes to Net Generation, probably many belonging to this category have never handed in an assignment written by hand nor mailed a letter by post, for example. Besides that, the way they see the world may be different from the other generations, as “their social worlds include not only physical locations, but also online worlds” (Carrier et al, 2009, p. 483).

The study conducted by Carrier et al (2009) enquired the participants about their media use and multitasking habits and showed that the presence of media multitasking habits increase from Baby Boomers to Net Geners, that is, Generation X multitasks more than Baby Boomers, and Net Geners multitask more than Generation X.

In terms of media generations, a simpler division between Digital Natives and Digital Immigrants has been proposed by Prensky (2001). The Digital Natives correspond to those who were born in an environment surrounded by digital technology, therefore mastering the language of computers, Internet and everything that derives from it. The shift to the computerized era has forced the older generations to learn this language, however "as Digital Immigrants learn – like all immigrants, some better than others – to adapt to their environment, they always retain, to some degree, their "accent," that is, their foot in the past" (Prensky, 2001, p. 2). Thus, a gap between generations may arise, as the more resistant to the immigration instructors might be, the bigger the gap between them and their students.

The most desirable immigration comprehends, besides adopting the use of new technologies, the awareness of the characteristics of the Digital Natives, such as the need of being constantly networked and their preference for multitasking. According to Prensky, "Digital Immigrants typically have very little appreciation for these new skills that the Natives have acquired and perfected through years of interaction and practice" (2001, p. 2), which leads to the assumption that instructors that belong to older generations and maintain their characteristics according to their generation, such as deep attention and need of material elements (Hayles, 2007), may have a more unfavorable attitude towards students' media use behavior in class.

2.7.2 Familiarization with media devices

As aforementioned, there are immigrants who develop the digital abilities better than others, therefore many Digital Immigrants can be very skillful with digital technology and incorporate it to a large extent in their lives. This acquaintance to digital technology may be provoked by different elements, for instance, a demand of one's work environment, friends and family influence, or personal interest. It is necessary to recognize that even though an immigrant will never be a native (Prensky, 2001), they can still be very familiar to media devices and deal very well with their dynamics in different environments.

Concerning attitudes, Fazio and Olson affirm that familiarity to an object plays a role, "it appears to breed linking even in the absence of beliefs about the object" (2003, p.

141). Besides this, the UNESCO Media and Information Literacy Curriculum for Teachers (2011) claims that teachers who are literate in information and media are able to stimulate the development of this kind of literacy also in their students, which involves the integration of media use and consumption of media in class. Therefore, it is expected that instructors who are more acquainted to media devices, by ownership of different devices, might be more favorable to students' media use behavior in class.

2.7.3 Teaching experience

As in any other activity, experience usually comes with time and practice. Continuous time of practice in teaching makes the instructor face a range of different situations, dealing with students with various profiles and backgrounds, and maybe even with different institutions profiles, which is expected to bring deeper experience and preparation in dealing with daily classroom episodes.

Schutz and Lee (2014) emphasize that the teaching activity has a strong emotional nature due to facts such as dealing with the same group of people for a continued period of time, in the case of university instructors, usually for at least a semester; and the constant evaluation of success concerning what was planned versus the results obtained, that is, expectations and outcomes, regarding different aspects, for instance progress of activities and students' acceptance.

Considering this complex environment that a classroom is for an instructor, part of the teaching activity comprehends "managing complex emotional classrooms transactions that tend to be even more pressing for novice teachers who are rarely prepared to manage the emotional events" (Schutz & Lee, 2014, p. 170). Thus, it is expected that more experienced instructors have better developed skills to deal with different situations in class, in the case of this study, the intense media use and multitasking behavior of students.

Furthermore, experience associated with the awareness of having developed skills may lead to confidence, which according to Schutz and Lee (2014) contributes to favorable evaluations of classroom events, since "appraising oneself as being in control and able to handle the situation tends to facilitate successful outcomes and

pleasant emotions such as pride and joy" (p. 172). The outcomes of experience, namely skills and confidence, might reflect on a tendency of more experienced instructors being not so bothered or threatened by students' media use behavior in class, therefore showing more favorable attitudes towards it.

2.7.4 Pedagogic approach

The way instructors conduct classes may also influence their attitudes towards media use in class. Studies have suggested that institutions and instructors must adapt their education environments to meet the demands of the new characteristics of current university students who are mostly Digital Natives. The characteristics include "little patience for lectures, step-by-step logic, and "tell-test" instruction" (Prensky, 2001, p. 3).

Therefore, instructors who use methods in their classes that involve excessive exposition, for example, lecturing, may find less engagement from their students. Tapscott (2009) criticizes the exclusive use of such method and argues that "it was designed for the Industrial Age. It revolves around the teacher who delivers a one-size-fits-all, one-way lecture. The student, working alone, is expected to absorb the content delivered by the teacher" (p. 122).

This situation can also be an impeller for students to use media more intensively in class, since one of the characteristics of the Net Generation is intolerance to boredom (Tapscott, 2009). Hence one-way expositive lectures may contribute to the gap between instructors and students, collaborating for instructors to develop a negative idea about media use behavior in class.

For Tapscott (2009), the current education system should embrace the characteristics of the Net Generation, thus switching the focus from the instructor to the student, interact with students instead of purely lecturing, and encourage student's participation.

Moreover, simply inserting computers in the classroom to make it "modern" will not work if there is still little interaction with students and little space to their

contributions. When the instructor decides to make use of technology in class, it is necessary to incorporate the tool in the method of teaching (Tapscott, 2009), in a process that is clarified by Norris et al (2011):

> Those teachers who are already using a more project-based/problem-based/ inquiry-based pedagogy, where the emphasis is on student-centered exploration, tend to find it easier to transform their existing curriculum into one that takes full advantage of the affordances of a networked environment (p. 20).

This is sustained by the recommendations of the Media and Information Literacy Curriculum for Teachers, which poses that media and information literate instructors "would be responding to changes in their role as educators, as teaching moves away from being teacher-centered to becoming more learner-centered" (UNESCO, 2011, p. 17).

The interaction between instructors and students is a topic that has been discussed for a long time. Paulo Freire (1983) is one of the references that discussed the most about the theme, defending how important it is to establish dialogue in education environments, valorize the knowledge, experience and background of students and be sure to be in the same level to avoid communication barriers.

With digital communication, the possibilities of establishing dialogue are much wider, as it is declared in the documentary Digital Nation - Life on the Virtual Frontier (Frontline, 2010) "Technology gives a new way to people to be intimate", although probably the instructors who already used to seek communication with their students are the ones who know best how to profit from this asset.

As mentioned previously, the instant access to information that mobile devices allow, give the students more independence from the instructor, contributing for a more equal level between educators and students, since the educator is no longer the absolute and unquestionable source of knowledge in class, as defended by Tapscott, "learning 2.0 is about dramatically changing the relationship between a teacher and students in the learning process" (2009, p. 148). From this point of view, students' media use behavior in class has potential to contribute to this dialogic and more

equally education environment that Freire (1983) recommended. Thus, instructors who favor a more dialogical relationship with students may view media use in class more positively.

Obviously this study does not intend to justify instructors' attitudes exclusively through the characteristics approached. The aspects were selected in order to being tested due to the relations aforementioned, however many other factors might influence instructors' attitudes in regards to students' media use and media multitasking.

2. 8 Summary

From the theories and studies reviewed, important aspects will be considered in this study, namely (1) implications students' media use and multitasking behavior might bring according to the teaching perspective, (2) instructors' attitudes towards those implications, and (3) possible influences to favorable and unfavorable attitudes.

The studies examined in the previous chapter regarding effects of students' media use behavior in classrooms, evidence or imply some aspects that might impact university education environments. The aspects extracted from the studies reviewed are summarized in Table 1.

Table 1: Aspects impacted by students' media use in class extracted from reviewed literature.

Aspect impacted	Study
Distraction of students	Hembrooke & Gay, 2003; Hayles, 2007; Lauricella and Kay, 2010; Hastall et al, 2012; Lee et al, 2012
Impairment of information processing	Yamamoto, 2007
Difficulty to control the learning environment	Yamamoto, 2007
Favorability of contextualization of contents	The Economist Intelligence Unit, 2008; Grinols & Rajesh, 2014
Worse results in evaluation	Sana et al, 2013

As this study analyzes the attitudes of instructors concerning these and other possible implications of students' media use behavior in classrooms, the three component view of attitudes (Rosenberg & Hovland, 1960) is adopted as reference to guide the aspects to verify attitudes. The model analyzes attitudes according to the responses to stimuli in the three spheres: (1) affective, corresponding to feelings and emotions; (2) cognitive, standing for opinions and beliefs; and (3) behavioral, that is, overt actions and statements of intent.

Finally, the third concern of this study is the possible explanations for instructors' favorable or unfavorable attitudes. The potential selected aspects to be tested correspond to instructors' personal and professional characteristics: (1) different generations: Baby Boomers, Generation X, Net Generation (Carrier et al, 2009); (2) familiarity with media devices (Prensky, 2001; UNESCO 2011); (3) teaching experience (Schutz & Lee, 2014); and (4) pedagogic approach (Freire, 1983; Tapscott, 2009; UNESCO, 2011).

The aspects this study aims to cover are presented objectively in the research questions and hypotheses in the following section.

2.9 Research questions

As systems get continuously more computerized in all spheres of society, laptops and mobile devices achieve exponentially more users, connecting people to the ocean of information available on the Internet and to different ways to consume and share data as well as interact to other people. Through these portable, connected and personal devices, a great deal of people's relationships with information and social interactions happen online, which impacts processes in different social environments, including educational ones.

In education terms, research has concentrated in examining the impact that current media use habits such as media multitasking have on learning (Lee et al, 2012; Sana et al, 2013). When it comes to teaching, scholars mainly give recommendations on how instructors should position themselves in the classrooms with digital native

students and their intense media use (Prensky, 2001; Hayles, 2007; Tapscott, 2009). Thus, the first question is posed aiming to verify the university instructors' perspectives on what are the implications to the education environment their students' media use and media multitasking in classes bring:

RQ1: What are the implications to the educational environment that university instructors identify in the students' media use behavior in classrooms?

As aforesaid, the relation between teaching and students media use and multitasking behavior in class is basically approached in the literature by giving recommendations on how instructors should act, either encouraging them to accept this trait of the young generations and adapt their classes to contemplate their intense media use needs and the consequences it brings; or by making explicit the negative impacts this behavior may bring to learning and discussing ways to control it. Therefore, it is intended to examine how the instructors themselves evaluate, feel and react concerning students' media use behavior in classrooms, terms that originate the second aspect inquired in this study:

RQ2: How favorable are instructors' attitudes concerning students' media use behavior in university classrooms?

Once the implications perceived by university instructors concerning students' media use behavior in classrooms are identified, as well the instructors' attitudes towards this behavior, the final matter comprehended by this study is verifying factors that might influence instructors' attitudes to be either favorable or unfavorable:

RQ3: Which instructors' characteristics influence their attitudes towards students' media use behavior in university classrooms?

The perception on how well students are learning certainly is an influencing factor, however might not be the only reason that determines how favorable instructors are concerning media use in class. Therefore potential aspects related to instructors' personal and professional characteristics will be examined in this study in order to understand why some instructors associate media use by students in class either with

barriers, discomfort and challenges; or with stimuli and opportunities. The aspects taken in consideration to relate as influences to instructors' attitudes are: as personal characteristics - generation, and familiarization with media devices; as professional characteristics – pedagogic approach, and teaching experience.

Firstly, the aspect of generation is examined as a potential influence. The computerization of systems in a wide range in society has been evolving quickly in the last three decades. Therefore, the ones who were already adults when this phenomenon started probably have a different media experience from the ones who were born after this period or were very young by then and grew up in the computerized era. Thus, it is expected that instructors from younger generations may accept more naturally students' media use and multitasking behavior:

> H1: Instructors who belong to younger generations have a more favorable attitude towards students' media use behavior in university classrooms.

Secondly, familiarization with media devices is tested as an influence to instructors' attitudes towards media use in classrooms. Even it is assumed that younger people are more acquainted to media technology, it is crucial to recognize that individuals of all ages can be skillful and very familiar to media devices and deal very well with them. Hence, despite of their generations, as more familiar instructors are to media devices, evidenced in this study by ownership of computers and mobile devices, the more they are expected to have positive attitudes towards their students' media use behavior in class:

> H2: Instructors who own more media devices have a more favorable attitude towards students' media use behavior in university classrooms.

Considering results of studies on the profile of Digital Natives, including "little patience for lectures, step-by-step logic, and "tell-test" instruction (Prensky, 2001, p. 3), and recommendations scholars have given for instructors to teach classes composed by Digital Natives, for instance switching the focus from the instructor to the student, interacting with students instead of purely lecturing, and encouraging student's participation (Tapscott, 2009), the pedagogic approach adopted by instructors will be tested at some extent, hypothesizing that instructors that use the

lecture as the main method for teaching have more negative attitudes towards students' media use behavior in class:

> H3: Instructors who use the lecture as the main method of teaching have a more negative attitude towards students' media use behavior in university classrooms.

The activity of teaching demands managing emotional transactions, especially due to the facts of dealing with groups of people and having a constant success evaluation between what was planned and what was actually achieved (Schutz & Lee, 2014). As in all activities, with time, instructors are expected to gain experience by facing different people and situations in their classrooms, therefore not being so susceptible to feeling threatened by unexpected situations, and also developing more realistic expectations towards their classes, avoiding being frustrated. Thus, it is expected that instructors with little time of teaching experience may have more negative beliefs, opinions and feelings towards their students' media use behavior in class:

> H4: Instructors who have less time of experience in teaching have a more negative implicit attitude towards students' media use behavior in university classrooms.

3 Methodology

An exploratory mixed methods study was designed to understand university instructors' perspective of the impact students' media use and multitasking behavior in class has on the educational environment. More specifically, the exploratory nature of this study aimed to identify the factors most impacted in the educational environment by students' media use and media multitasking behavior in class, and the attitudes instructors have towards it. Besides this, it was sought to understand the relationship between instructors' personal and professional characteristics with the nature of their attitudes towards the mentioned students' behavior.

As this investigation is concerned about different aspects of the situations involving university instructors and students' media use in classrooms, and the literature reviewed offered limited resources in terms of exploring the teaching perspective about media use and multitasking in educational environments, the main purpose of adopting a mixed methods approach to the research was development of instrument, that is, by first conducting an initial qualitative exploration to inform the secondary quantitative part and construct the data collection instrument.

Thus, mixed methods approach was thought to be more effective to answer the different aspects asked in the research questions, following a pragmatic paradigm, which supports the practice of "instead of focusing on methods, researchers emphasize the research problem and use all approaches available to understand the problem" (Creswel, 2009, p. 10).

In the definition by Onwuegbuzie and Leech, "conducting mixed methods research involves collecting, analyzing, an interpreting quantitative and qualitative data in a single study or in a series of studies that investigate the same underlying phenomenon" (2006, p. 474), thus the research using qualitative and quantitative data may take a variety of paths. As the function of the mixing in this cross sectional study is exploration, a sequential design was chosen, permitting the researcher "to elaborate on or expand on the findings of one method with another method" (Creswel, 2009, p. 14), with the qualitative phase being conducted first, followed by the quantitative stage. The main results that contributed to the final discussion and conclusion drawing

came from the quantitative procedures, therefore the weighting of this study lies on the quantitative part.

The mixing is characterized as connected, meaning that the "mixing of the quantitative and qualitative research are connected between a data analysis of the first phase of research and the data collection of the second phase of research" (Creswel, 2009, p. 208). The mixing occurs when initial qualitative results inform the secondary quantitative data collection, that is, construction of survey questionnaire.

Considering that the first two research questions aim to provide descriptive results of the phenomena due to the fact it is still scarce in previous studies, the qualitative step permitted to diagnose key elements referring to RQ1 and RQ2 to be enquired on the survey questionnaire, and through the survey being possible to "determine the distribution of phenomena within a chosen population" (Creswel, 2009, p. 211). The third research question aimed to test hypotheses, therefore the qualitative part helped identify independent variables to generate hypotheses, then the quantitative results permitted to test relations enquired in RQ3.

The following paragraphs explain the application of the specific methods of data collection, analysis and interpretation of both the qualitative and quantitative parts of this investigation. Detailed explanation on how the qualitative phase informed the quantitative one, and how variables were operationalized are displayed on the findings section in Chapter 4.

3.1 Qualitative phase

3.1.2 Interviews

As the researcher had from the literature review a focus on the broad aspects to be covered in order to get input for building the questionnaires, semi-structured interviews were conducted, "so that the more specific issues can be addressed" (Bryman, 2012, p. 472).

The interviews were interviewer-administered, two conducted via Skype, recorded through the software Call Recorder – Demo Version; and one personally, recorded

through the application Voice Recorder on a smartphone LG E-610. The interviews lasted between 37 and 54 minutes. After the interviews were conducted and recorded, they were transcribed in typed format for the analysis, and then the transcriptions were checked for accuracy. The interviews transcripts are available for consultation in Appendix B.

3.1.2 Sample description

A purposive sample consisting of three university instructors was adopted. As the interviews served the main purpose of getting input to inform the process of constructing the survey questionnaire, it was aimed to sample university instructors, which is the unit of interest defined by the research question, but that differed from each other in characteristics such as area of studies, years of experience in teaching and nationality (Bryman, 2012). Therefore, with the results, it was aimed to expand the topics obtained by the literature review, rather than getting definitive results for the study discussion or conclusion drawing.

Three interviews were conducted during February 2014 with university instructors, all females, two from Brazil and one from Germany. Two of them belong to Social Science and one from Natural Science. Two have in average five years of experience in teaching and one has over 30 years. The profiles of the interviewees are displayed on Table 2.

Table 2: Overview of interviewed cases.

	Country	Area of studies	Teaching experience	Generation
Interviewee 1	Brazil	Social Sciences	5 years	Net Generation
Interviewee 2	Germany	Social Sciences	4 years	Net Generation
Interviewee 3	Brazil	Natural Sciences	31 years	Baby Boomers

3.1.3 Interview guideline

The interview guideline consisted of five main points. Firstly, an introduction explained the interviewee the purpose of the interview, gave information about the procedures of the study, clarified the concept of media use and multitasking in classrooms, and elucidated about topics of anonymity of source, as suggested by Berger (2011).

Afterwards, a set of questions about the personal and professional profiles of the instructors were asked, followed by questions about their personal media use habits. These questions aimed to explore the personal and professional characteristics that could be potential explanations for the nature of instructors' attitudes towards media use and multitasking in class.

In the sequence, in line with Rosenberg and Hovland's (1960) three component view of attitudes, three blocks of questions followed, asking firstly about instructors' ideas and opinions regarding students' media use habits in class – cognitive component; secondly about their feelings towards the mentioned situation – affective component; and finally about their actions in the referred scenario – behavioral component.

Especially the questions about attitudes were exposed in a way that attempted to give freedom to the informants, so that they could bring up new topics to their answers that could generate questions that were not previewed in the guideline. However, the framework with main and follow up questions was followed in order to ensure that the same predetermined areas of interest were covered in all interviews. The interview guideline is available for consultation in Appendix A.

3.1.4 Method of analysis

As the main function of the interviews was to provide resources to inform the construction of the survey questionnaire, the data collected needed to be classified and categorized; therefore the strategy of thematic analysis (Bryman, 2012) was employed.

The interviews were coded by themes that were predetermined by emerging points of the literature review, namely cognitive attitudes, affective attitudes, behavioral attitudes and personal characteristics. After conducting, transcribing and reading through the interviews, another theme was added: impacted aspects in the educational environment. The coded data were represented in a matrix, displaying the themes, the case, i.e. the interview, and the fragment of the interview that classifies under each theme, indicating the line number to which the fragment belongs, in order to locate it in the transcript.

3.1.5 Reliability and validity

Even though, as aforementioned, the results of the qualitative procedures were used for instrument development of the second phase of the research and did not aim to draw conclusive findings, measurements to guarantee quality in the procedures were taken into consideration. Lincoln and Guba (1985, as cited in Glogowska, 2011) consider a series of aspects to be more suitable for qualitative studies as criteria in order to seek trustworthiness:

- credibility - the findings make sense and are acceptable to be believed;
- dependability - the findings would be repeated in a similar context;
- confirmability/transparency - it is clear how the research was conducted;
- transferability - the findings would be relevant to another setting.

In order to ensure credibility, the procedures were documented (recorded audios of interviews, transcriptions, and coded data), allowing constant comparison and consultation. Besides this, the audios were crosschecked several times with the transcripts, and small corrections were made, so that the material for the analysis would have enough fidelity to what was collected. In order to obtain transparency, the researcher sought to specify every step of the procedures conducted and convey the findings in a thick description, as well on how they were employed to construct the survey questionnaire.

Considering that the sample was very small and served merely to get an impression of the attitudes of instructors and collect further ideas concerning media use and multitasking in classrooms, the validation of the procedures in terms of dependability

and transferability are more likely to be verified in the last phase of the study. According to what Creswel (2009) suggests for mixed methods studies aiming instrument development, the first qualitative parts obtains themes and specific statements from participants, the following phase adopts the specific statements, items and themes for scales composing the survey questionnaire, and the final phase validates the instrument with a larger sample.

3.2 Quantitative phase

3.2.1 Survey

The quantitative part of the study collected data through a survey, which consisted of a self-administered questionnaire with unsupervised administration, distributed via Internet, in English language.

The questionnaire consisted of six sections. After an introduction, which explained participants on the purpose of the survey and gave basic instructions, there was the first set of questions about instructors' profile. These questions that asked about instructors' personal and professional characteristics were split in two sections, one at the beginning and the other at the end of the questionnaire. At the beginning it was asked about instructor's area of science and media use habits. At the end, the questions were about gender, age and years of experience in teaching. The purpose of these profile questions was collecting data that could be tested as possible influences to instructors' attitudes.

The second set of questions asked about students' media use and multitasking in class. The first question of this set asked whether the instructor normally see this behavior in class, serving as filter, that is, the ones who do not see the behavior in their classes would go directly to the end of the questionnaire. The other questions of the set asked about prevalence of the behavior in percentage of the students and class time, with the purpose of comparing the perception of instructors with the results of other studies on media use prevalence of students in class.

The third and fourth sets of questions were about implicit attitudes, corresponding to the cognitive and affective spheres; and fifth set consisted of behavioral attitudes. The questions belonging to these sections were displayed to respondents in random order. These inquiries consisted mostly of statements representing these components of attitudes taken from the interviews of the qualitative phase, so the distributions in a larger sample could be established in the quantitative phase.

Finally, there was an optional open question, where instructors could write remarks about their experience and perception about students' media use and multitasking in class, if they wished; followed by the closure questions that corresponded to the second set of instructors' profile, already mentioned in detail. The questionnaire can be consulted in Appendix C.

3.2.2 Pre-test

The survey questionnaire was pre tested and adjusted in the period from July 16th to August 20th. The first two versions of the questionnaire, which were pre-tested, were built and administered on the free online program Surveyplanet.com.

Two university instructors tested the first version of the questionnaire. After their feedback, adjustments such as wording of questions, values of scales, and complementation of information, were made. The second version of the questionnaire was tested by another university instructor, which led to further clarification of terms used in questions and rearrangement of order of questions.

The third version of the questionnaire was built on the online program Unipark, due to the wider possibilities of tools to organize the survey layout and filtering. One more instructor tested this version. Afterwards, the survey was considered sufficient to be sent to the study sample.

In the data set, the case corresponding to the tester was eliminated in order to not interfere in the results.

3.2.3 Data collection

The survey was administered via the online survey program Unipark, between August 29th and September 13th. The respondents for the survey were acquired through a convenience sample, so that contacts of university instructors were gathered from personal contacts and retrieved from university webpages in Germany and Brazil. The survey link was sent to the contacts in an invitation email, explaining the purpose of the survey and the study. Moreover, it was asked the contacts to forward the link to their contacts, classifying also as a snowball sample.

3.2.4 Validity and generalizability

Procedures to ensure quality of the quantitative phase were taken in consideration. The interviews conducted in the qualitative phase allowed the researcher to get close to the subject, thus obtaining the aspects that are important to them as well as the language they use, so the wording of the survey questions would be clear to respondents. Furthermore, the versions of the instrument of data collection were pre-tested by and discussed with experts, who have given feedback and allowed the instrument to be adjusted. Besides this, once data was collected in the quantitative phase, a factor analysis was conducted to confirm the variables were measuring the dimensions the researcher had proposed. Through these procedures it was sought to achieve validity.

Since previous similar investigations were not found, the main idea was to have an initial input from the instructors' perspective on students' media use and multitasking during classes. Therefore, generalizability was not a goal in this study. Moreover, in order to generalize results, a very comprehensive sample of university instructors would be necessary. As a convenience sample was adopted, the results cannot be considered definite, but can serve the purpose of contributing to the discussion and animating studies in this direction, as Bryman (2012) clarifies about the adoption of a convenience sample "The data will not allow definitive findings to be generated, because of the problem of generalization, but they could provide a springboard for further research or allow links to be forged with existing findings in an area" (p. 202).

4 Findings

As this study consists of two phases of data collection, firstly the findings of the qualitative stage will be presented, also specifying to which extent it informed the quantitative phase. In the sequence, the results of the quantitative phase are communicated and analyzed.

4.1 Qualitative phase

4.1.1 Instructors' perceptions about media use behavior of students

According to the literature reviewed in this study, media multitasking is a prevalent audience behavior in a variety of environments (Foher, 2006; Lui & Wong, 2012; Jeong & Hwang, 2012), including in university classrooms (Lauricella & Kay, 2010; Hastall et al, 2012). Accordingly, it was possible to verify that the interviewed instructors notice the phenomenon in a very evident way in their classes. They were unanimous in affirming they perceive their students using media devices intensively in class, associating this behavior mainly to social media activity. One instructor stated she believes that students have compulsion for social networks, whilst other one said social media creates the need in people of being connected all the time, so that students may not even know why they are accessing their devices in some moments: "probably the students themselves don't really know why they are having their laptops with them, why they are opening them, maybe it is also mechanically, automatically" (I2, lines 277 - 279).

Concerning the most common situations when students present this behavior, one instructor mentioned that large classes, especially lectures, are the environments where students are more likely to use their devices to do personal tasks rather than paying attention to the class. On the other hand, another instructor affirms having observed this behavior more intensely in laboratory classes, in which students must

work with computers, and therefore cannot resist working with many open windows, multitasking with personal activities.

Another aspect in which instructors were unanimous was in associating the intense media use behavior to the (im)maturity of students. In general, they believe students sometimes lack maturity for realizing there are specific moments in class when they should prioritize and focus their attention, leaving their devices and media activity aside, as one interviewee declared "(…) maybe because they are very young, and I cannot understand well why there isn't the concentration we need in that moment [of the class]" (I1, lines 94-95; explanations added in brackets and translation made from Portuguese by the researcher).

They perceive that students want to have fun and be entertained continuously, besides accessing a variety of contacts and tasks that may not be associated to the class, according to one of the interviewee's opinion, the proliferation of technologies created an organic necessity in people of linking contacts and tasks everywhere they go (I3, lines 77-78), which is in accordance to the studies that report that some of the main gratifications people find in multitasking with media is fighting boredom (Tokan & Matilla, 2011; Hastall el al, 2012) and the possibility to access work, study, leisure and socialization spheres at the same time (Bardhi et al, 2010).

4.1.2 Aspects impacted in classroom environment

The main aspect impacted by students' media use and multitasking behavior in the educational environment that came up in the interviews was students' attention, which is also the main point that studies and scholars discuss about the impact of media use and multitasking on learning (Prensky, 2001; Hayles, 2007; Lee et al, 2012; Sana et al, 2013). Even though the instructors recognize the potential these tools have to aggregate on some activities proposed in class and on the communication process within the group, they were unanimous in affirming that portable media devices with Internet access are a great source of distraction, especially empowering the natural concentration deficit that some people already have.

The natural characteristics of students were also mentioned by instructors in terms of how they use media devices in class, and consequences it brings to their engagement in the learning moment and their results in evaluations. Instructors affirm that students who are more engaged and interested in class activities usually use their media devices for purposes related to the class, and normally it corresponds to the people with the best results in class. However an instructor estimated that only around 30% of the students in a class would use media devices related to study purposes, the other 70% would use for personal use, especially Facebook activities.

The same instructor reported that the excessive use of media devices by students during class affected sometimes the tuning between instructor and students, in the sense that their foci in class in some moments seem to be so distinguished. This can be connected to the phenomenon of incompatibility between the environment educational institutions create and the needs of the students who belong to the generation of Digital Natives, mentioned by Hayles (2007), which may cause the lack of interest and engagement in students, and the feeling in instructors of not identifying with students' goals in class. The instructors commented that they perceive many young people seem to be addicted to social networks, and they relate to the maturity of the person the ability to understand the moments that are not appropriate for those activities.

On the other hand, the instructors also recognize educators need to analyze their familiarization with the new ways people are communicating and are relating to information, which is also the recommendation of scholars that affirm the educational environment must adapt to new traits and necessities of the digital native learners (Prensky, 2001; Hayles, 2007). One of the instructors observed that until a couple of years ago the official communication among members of a class would occur via e-mail, and nowadays it is processed mainly on Facebook. Thus, these new possibilities of communicating also present wider opportunities for instructors to create channels to interact with and get closer to students.

Concerning using media devices for study related purposes, an instructor evaluated positively the instant access students have to the web as a source of information to clarify terms or points that might be not so clear to them during a lecture or seminar.

The instructor considered this independency of the student a good thing, so that the student does not need to interrupt the class to ask clarification to the instructor or to a peer. Besides this, instructors remarked that this instant access to the web facilitates the application and visualization of the contents worked in class in their real context.

One of the instructors highlighted the importance of being in the same time of the student: "I believe the lack of modernization of teaching tools distances the student from the teacher (…) I believe the teacher cannot be in a different time from the student's" (I3, lines 16-17, 20-21), meaning that instructors must be up to date with communication technologies and incorporate it to the classroom, both in terms of methodology and being present in virtual spheres of communication. All the instructors interviewed considered that the use of media devices offer possibilities that are relevant to their academic and professional fields. Thus, having these mobile devices in class can aggregate positively to the education environment and prepare students to their future professional reality.

4.1.3 Instructors' attitudes

When instructors refer to the positive side of the use of media devices by students in class, the aspects are mainly connected to the possibilities to develop practical activities in class, accelerating the production process and giving instructors opportunities to create different activities and even propose tasks spontaneously during class.

Regarding this aspect, instructors affirmed feeling positive about having the web as a resource to use with their students. In terms of actions, they ask students to accomplish tasks on their devices during class. One instructor, who also proposes activities online outside official class time, affirms rewarding with grades the students who make these contributions online.

Besides this, instructors recognized that media devices present potential to establish channels of communication with students, which can contribute to their interaction and proximity. One instructor makes herself available online to students outside the class, on Facebook chat, for example:

> "The proposal is that these tools work as one more way to approach student and teacher, amplify our contact, our possibility of interaction. When I am working, I am developing class material, I have my email open, I have my Facebook open, when the student sees something [related to the class], he calls me, he knows I am there [online], he comes to talk to me, I answer, and we discuss." (I3, lines 143-147, explanations added in brackets and translation from Portuguese by the researcher)

The same way media devices permit students to multitask with personal activities while they are in class, actions like this one cited by the interviewee also make possible that the situation works the other way around, that is, that students multitask with their learning sphere while they are out the class, maybe as in the example, when they are on Facebook, where it is expected that they are most dedicating to personal activities.

The negative attitudes are mostly related to the dispersion of attention of students in class when they are multitasking with their media devices. The interviewees claim that there are specific moments in class that would demand students to concentrate more, for instance, when students should engage in some reflection in order to process the information worked in class, and be able to develop deeper conclusions and even come up with questions and contributions.

Instructors mentioned this situation might cause them to feel irritated, distracted or uncomfortable. As reactions, they reported asking students to switch off the devices sometimes and calling their attention verbally when they get very dispersed and are not in line with the activities proposed in class.

4.1.4 Informing the survey questionnaire

The main form in which the interviews have informed the quantitative phase for building the survey questionnaire was on the aspects of attitudes. In order to enquire about cognitive, affective and behavioral attitudes, statements expressing them from the interviews were taken, so the distributions could be verified in a larger sample in the quantitative phase.

The statements concerning implicit attitudes were placed in the questionnaire with either a positive or negative appraisal, according to the statements from the interviews and the literature that served as sources, for participants to answer with a five point Likert Scale ranging from "Strongly agree" to "Strongly Disagree", plus the option "I do not know". The statements regarding behavioral attitudes, because they are actions, were presented with a five point Frequency scale from "Always" to "Never".

The implicit attitudes consisted of a fusion of cognitive and affective attitudes. In the interviews, instructors mentioned the aspects in which they perceive students' media use impacts the classroom environment with a cognitive evaluation. Therefore, for the questionnaire, the questions aiming to verify the cognitive attitudes of instructors concerning students media use and multitasking in class were mostly related to the aspects impacted either in a positive or in a negative way, as mentioned on the interviews, combined with the ones extracted from the literature review (see Table 1).

Concerning affective attitudes, the feelings expressed in instructors' speeches that they associated to students' media use and media multitasking in classrooms ranged from trust and excitement, to distraction, frustration, and irritation. Moreover, the statements that revealed a strong subject tone rather than an objective evaluation of an aspect impacted in the educational environment, for example relating to the role of the instructor, and the relevance of their functions, were also used in the attempt to explore affective attitudes in the questionnaire.

However, it is difficult to precise the measurement of ideas and feelings and establish borders to their dimensions, since they may overlap and mix up. Therefore, in order to analyze the data, it was more sensible to consider that the questionnaire assessed the implicit components of attitudes in general, contemplating both cognitive and affective aspects rather than separating them into two different components.

As the first research question of this study seeks to verify *"what are the implications to the educational environment that university instructors identify in the students' media use behavior in classrooms",* the interviewed instructors' speech permitted to

collect some aspects, for instance students' attention, visualization of contents in their real context, etc., as mentioned in previous sections.

In summary, the implications mentioned in the statements of the instructors who were interviewed in this study constitute a set of aspects of the educational environment that are impacted by students' media use in class either in a positive or in a negative way. Even though some aspects refer more to the teaching activity, that is, the functions and role of the instructor; and others more to the educational environment in general, most of them affect both, since the teaching activity is part of the learning environment, and what occurs in the environment influences the teaching activity as well.

Overviews of variables that correspond to the implicit components of attitudes, that is, the positively and negatively impacted aspects that were extracted from the literature review and interviews and composed the survey questionnaire are presented on Table 3 and Table 4, respectively.

This division between positively and negatively impacted aspects will allow testing in the quantitative phase with a bigger sample the dominant position of university instructors towards students' media use and multitasking in classrooms. This way it will be possible to verify either if they see in it mainly advantages, revealing a positive attitude, thus seeing a resource in their students' use of media; or if they find the disadvantages more striking, therefore considering media use and multitasking behavior in class as a competitor, in a negative attitude in general. Finally, in terms of behavioral attitudes, actions taken by instructors were listed as possibilities for respondents to indicate how they deal with the phenomenon. The actions collected are listed on Table 5.

Table 3: Aspects positively impacted by students' media use and multitasking in classrooms.

Variable	**Reference**	**Questionnaire item** Students' use of media devices in class…
Relevant to career	" You cannot leave university without learning to use the things that you will use in your professional life. (…) So all these devices are fundamental" (I1, 335 - 337).	…is relevant to prepare my students for their careers in the field I teach.
Students' participation	" …as we have an online discussion forum, students post news, and I perceive many are ready with their news and comments in the classroom, they are already prepared" (I3, 229-230).	…collaborates for students to participate more actively in class by bringing new information.
Help to teaching	"There is a vast way to be explored in the use of technology on the teaching methodologies. (…) demystifying difficulties, demystifying the distance between things, I believe all this technology provides it" (I3, 339-342, 344-345).	…helps my work as instructor by offering resources and tools to the teaching activity.
Context of contents	The Economist Intelligence Unit, 2008; Grinols & Rajesh, 2014 "I realized as much as the technology was entering my classes and my courses, this helped a lot the approximation of contents [to reality]" (I3,100 -102)	…helps show how the contents worked in class apply in reality.
Students' independence	"…if you don't understand something, it can be a word, you can look it up and so you can get back to the context and understand it much easier and you don't disturb the process [of the class]" (I2, 197-198)	…is a good resource for students to search for further information in class, without depending on me.
Interaction instructor - teacher	"…the proposal is that these tools be another way to approximate us, to amplify our contact, our possibility of interaction" (I3, lines 143-144).	…gives more opportunities for instructor and students to interact, establish dialogue, exchange ideas.
Spontaneous tasks	"I think it is rather positive, as I said, and do also spontaneous tasks and say ok, let's split up in two groups and you work on a certain task" (I2, 188 -190).	…makes me feel more confident to conduct activities and come up with spontaneous tasks.
Efficiency of class	"…there were times that I felt glad, much more relaxed, to know that the agility of the process [in class] will be greater" (I1, 261)	…makes my classes more efficient, in general.
Motivation to teaching	"I see that my profession is perfectly delimited before and after [media technology], I see, as a teacher, I grew a lot, I expanded my vision (I3,. 321 -323)	…contributes positively to my motivation to teach.
Help to students' learning	" the students have the possibility to look things up" (I2, 302) "I perceive that the learning became much more dynamic and interesting this way" (I3, 108-109)	…helps students learn in class.

Translations and clarification in brackets done by the researcher. Questionnaire items had a scale of Strongly agree, Agree, Neither agree nor disagree, Disagree, Strongly Disagree, and I do not know.

Table 4: Aspects negatively impacted by students' media use and multitasking in classrooms.

Variable	Reference	Questionnaire item Students' use of media devices in class…
Distraction for students	Hembrooke & Gay, 2003; Yamamoto, 2007; Lee at al, 2012; Sana et al, 2013 " the younger they are, the greater their distraction is" (I3,188) " if there are people that are continuously on their laptops (…) I think they are all distracted" (I2, 211-212) " …so the attention deficit that some people naturally have I believe is empowered with these devices" (I1, 184-185)	…affects negatively students' ability to focus on and follow the activities developed in class.
Students lack interest	"I think they are on Facebook (...) They are looking for having fun" (I1, 299,302)	…gives me the feeling students are not interested in the class.
Teacher irrelevance	Sana et al, 2013	…brings the feeling my role and functions as instructor are not so relevant for the learning and development of students.
Students not in line	"... it was maybe my incapability, maybe theirs, of getting us tuned" (I1, 90)	…gives me the feeling that students are not in line with me in terms of goals and purposes of the class.
Teacher feels threatened	Bayne & Ross, 2007	…makes me feel threatened by the empowerment it gives to students to check, confirm and confront the information I give in class.
Difficult to control	Yamamoto, 2007	…makes it more difficult for me to control the learning environment.
Distraction for teacher	"But if I am doing this too often thinking about those ones who open their laptops I would be distracted myself" (I2, 233 -234)	…disturbs my ability to focus on the planned activities and on the goals of the class.
Irritation	"Sometimes I get irritated (…) argue with them, call their attention" (I3, 191-192)	…irritates me for the dispersion it causes in students.
Bad feeling	" I never do this [use media devices when attending classes] because I think my instructors will feel as bad as I felt with my students in my classes" (I1, 149-151)	…makes me feel bad.
Worse results	Sana et al, 2013 "I'd say that 70% of them are not using [devices] for research. The other 30% correspond to the best results in class" (I1, 285-286)	…impacts negatively students' results in assignments and other evaluative tasks.
Information processing	Yamamoto, 2007 "…when they need to go through an evaluative and reflective process, [media devices use] is harmful" (I1, 246-249)	…harms students' capacity to process the information worked in class.

Translations and clarification in brackets done by the researcher. Questionnaire items had a scale of Strongly agree, Agree, Neither agree nor disagree, Disagree, Strongly Disagree, and I do not know.

Table 5: Actions taken by instructors to deal with students' media use and multitasking in classrooms.

Variable	Reference	Questionnaire item How often do you adopt each of the actions below?
Accept behavior	"I have students that are all connected on their laptops all the time, so I just think ok, they might be multitasking, as long as they follow and they fulfill the task, it is ok for me" (I2, 110 -112)	I accept students' use of media devices in classrooms as something normal.
Adapt method	"I have a website for my courses (…) We use Skype, when there was MSN, we used MSN (…) I use Facebook a lot with them [students] (…) along with that, I have a discussion forum" (I3, 110-117)	I adapt my method of teaching to make my classes more interesting to win my students' attention.
Ask students to use	"In journalism classes to check data, confirm facts, when a reporter comes with information from the street, it is possible to talk to him or simply do all of this here [on the media devices]. I've stimulated the use of devices in class many times. (I1, 316 – 320)	I ask students to use their devices to accomplish some activities in class.
Call attention	"Sometimes I get irritated (…) argue with them, call their attention" (I3, 191 - 192)	I call my students' attention verbally when they are using media not in line with the class activities.
Incorporate devices	"I say come together in groups and work on a task, I can be sure that at least one of them has a mobile device to go online and check out some data and do some research" (I2, 170–172)	I incorporate the use of students' media devices in the activities of my classes.
Set rules	Yamamoto, 2007; The Economist Intelligence Unit, 2008; Glen, 2010; Lee et al, 2012	I establish rules for media devices use in my classes.
Move to check	Yamamoto, 2007 "I go around the class to check [what they are doing in the devices], and I ask them – 'hey, how is the task going?'" (I1, 280-281)	I move around the class to check what my students are doing on their devices.
Ask to switch off	"if the task has nothing to do with social networks, I tell them to switch off...In some situations I would say, 'people, turn it off'" (I1, 173-176)	I ask students to switch off their devices in some moments of the class.
Forbid	Yamamoto, 2007; Glen, 2010	I forbid my students to use their devices in class.

Translations and clarification in brackets done by the researcher. Questionnaire items had a scale of Always, Frequently, Sometimes, Rarely, and Never.

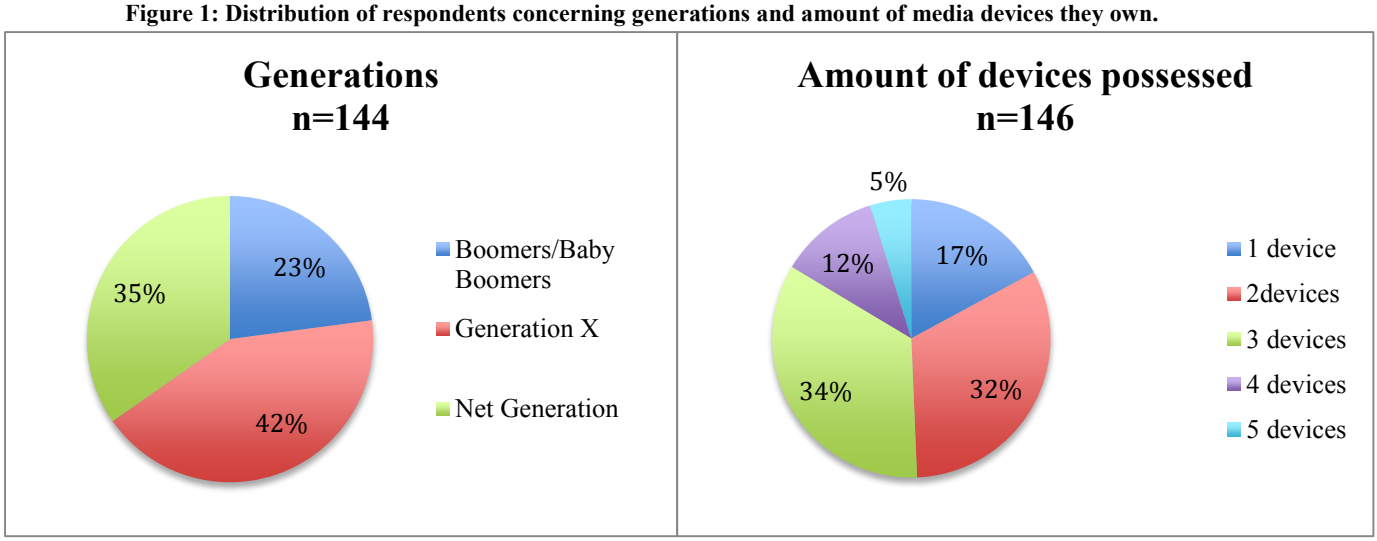
4.2 Quantitative phase

4.2.1 Sample description

The sample of the quantitative phase consisted of 146 survey respondents, all university instructors, 70% males and 30% females, born between 1938 and 1989 (*M*: 1972, *SD*: 11.12). As the difference of attitudes among different generations of instructors and levels of familiarization with media devices are of interest of this study, Figure 1 shows the distribution according to these aspects.

The biggest share belongs to Generation X (born between 1965 and 1979); whilst Net Generation (born between 1980 and 1989) is represented by 35% of respondents; and Boomers (born before 1946) and Baby Boomers (born between 1946 and 1964) complete the sample. The variable of devices possessed was selected to represent to some extent the level of familiarization with media devices, assuming that the more media devices a person possesses, the more familiar the person will be concerning how these devices work and what it is possible to perform on them. As Figure 1 shows, the majority of surveyed instructors own at least two media devices.

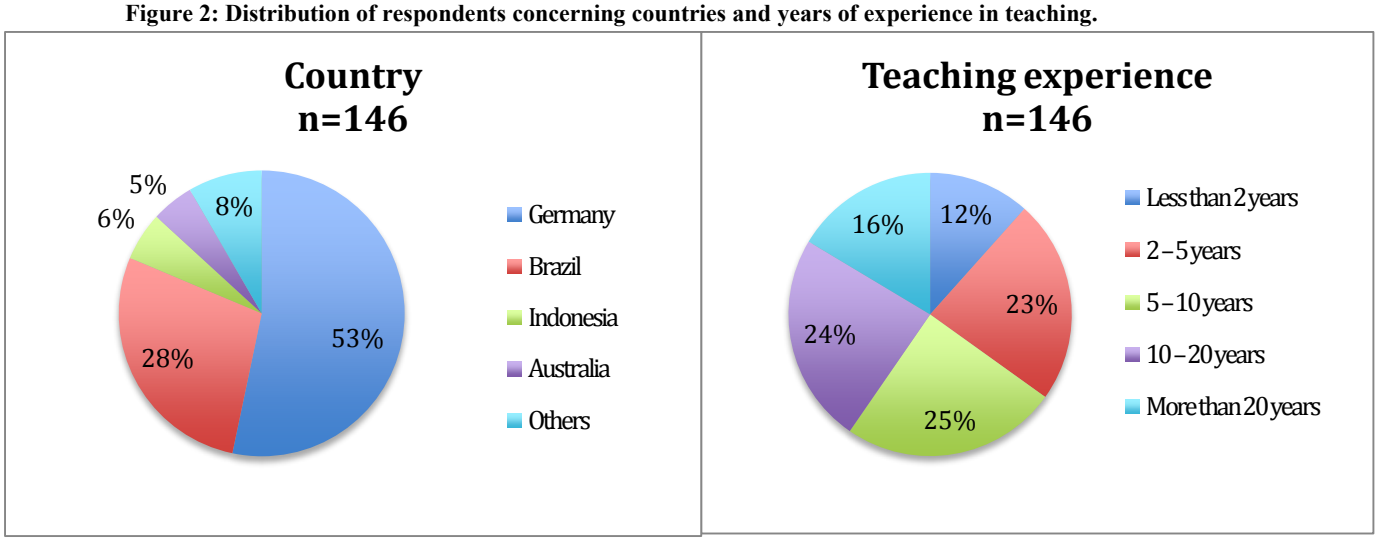
Figure 1: Distribution of respondents concerning generations and amount of media devices they own.



The majority of respondents teach in universities in Germany (53%) and Brazil (28%). A few cases from universities in Indonesia, Australia, Spain, USA, Pakistan,

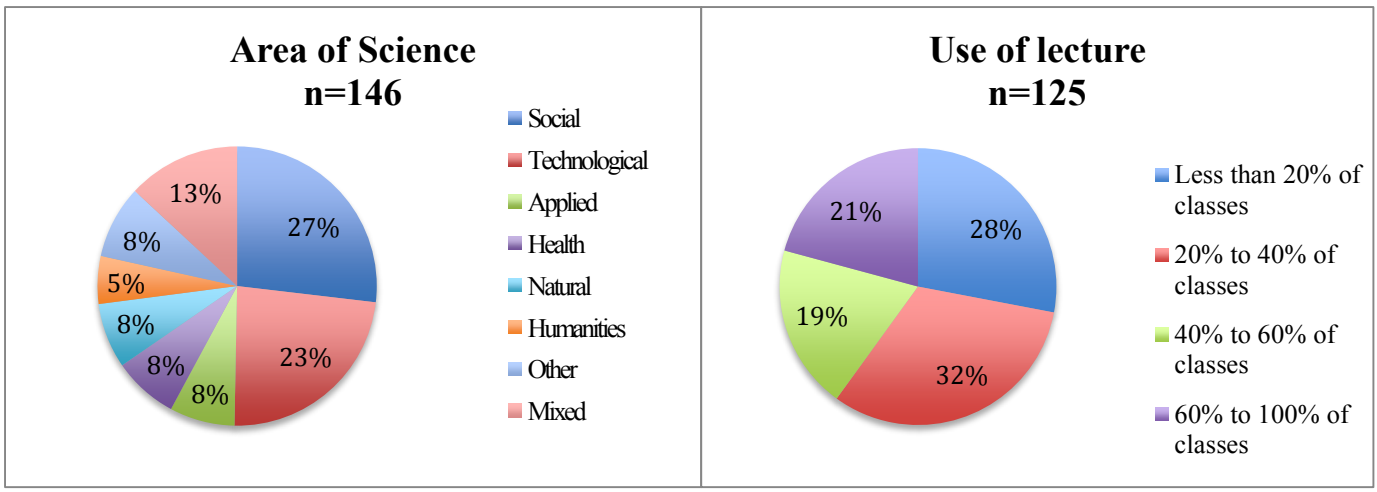
Colombia, Peru, Tanzania and Poland complete the sample, as demonstrated in Figure 2. Concerning their time experience in teaching shown in Figure 2, the sample ranges between instructors who have started teaching less than two years ago (12%) to the ones who are over 20 years in the activity (16%), the other three quarters of the respondents are well distributed in groups with experience up to five years, five to ten years, and ten to twenty years.

Figure 2: Distribution of respondents concerning countries and years of experience in teaching.



In terms of areas of science for which the instructors teach, Figure 3 illustrates that half of the sample belongs to Social (27%) and Technological (23%), followed by Natural, Applied Health, and Humanities. The ones who teach other areas such as Formal Sciences, Earth Sciences and Education, and instructors that work in mixed areas, that is, teach concurrently in two or more different areas, complete the sample. Another interest of this study is the relation between the use of lecture as teaching format and instructors' attitudes toward students' media use in class. A third of instructors estimated to use the lecture to teach between 20% and 40% of their classes; 28% indicated to teach less than 20% of their classes in lecture format; whilst 21% of respondents indicated to use the lecture in most of their classes, as shown in Figure 3.

Figure 3: Distribution of respondents concerning area of science and use of lecture as format to teach classes.

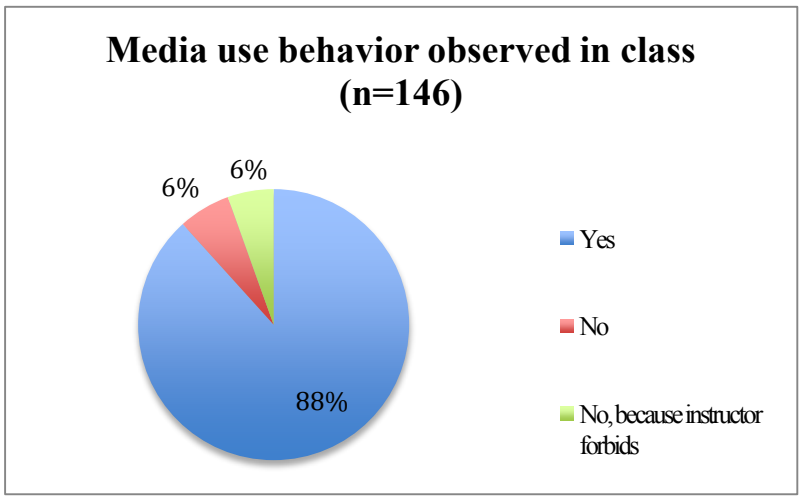


In the following section it is presented the perception of the instructors concerning the prevalence of their students' media use and multitasking in class.

4.2.2 Prevalence

Studies whose object was the media users reveal that multitasking with media is a prevalent behavior, including in university classrooms (Foher, 2006; Lauricella & Kay, 2010; Hastall et al, 2012; Voorveld & Van der Goot, 2013), as already examined in the literature review. Therefore, it was investigated how prevalently this behavior was recognized by the instructors in their classes. In line with the statistics presented by the studies on multitaskers, the great majority of respondents (88%) affirm seeing their students multitask with media during classes, as shown in Figure 4. The small share of instructors who affirm not seeing this behavior among their students are divided between instructors who forbid media use in their classes, and the ones who report the absence of it in their classes.

Figure 4: Distribution of respondents concerning observation of prevalence of students' media use in class.



From the instructors who perceive the behavior, Table 6 shows that the majority (65%) estimates that maximum half of students multitask with their devices during class, and that they occupy maximum half of the class time with it (79%). Besides this, many instructors (46%) are optimistic in estimating that students use their media devices for personal use in less than a quarter of class time.

Table 6: Instructors' perception on prevalence of use of media devices by students in class.

	Students using in class (n = 129)	**Class time spent with media use** (n = 129)	**Assumed personal use during class** (n = 129)
Less than 25%	33%	39%	46%
25 – 50%	32%	40%	33%
50 – 75%	27%	19%	14%
75 – 100%	8%	2%	7%
Total	100%	100%	100%

Many instructors are aware of the media multitasking behavior of their students in their classes, although some may underestimate the popularity and frequency of the practice among students, since the numbers in the studies that surveyed multitaskers in class were expressive, as in Lauricella and Kay (2010), where up to 70% of the surveyed students multitasked with non academic activities in their devices in up to

50% of class time, and 31% reported doing so over 50% of class time; and in Hastall et al (2012), where the average time spent on multitasking with media devices in class was 30% of a lecture duration.

Obviously frequency and intensity of media multitasking behavior in university classrooms vary, and it would be necessary to verify students' actual media behavior in a class and compare to what the instructor perceived in order to draw clearer conclusions about how much of this behavior instructors are able to perceive. However it is possible to consider that instructors might underestimate frequency and intensity of media use in class, perhaps for not realizing every time students are multitasking, or for preferring to focus attention on the students who seem more attentive on the class.

4.2.3 Implications students' media use bring to class

From instructors' opinions hat were stated in the interviews conducted in the qualitative phase, associated to the experiences reviewed in the literature, a list of elements of the educational environment impacted by students' media multitasking behavior in class was collected, constituting a set of aspects that are positively and negatively impacted by having students using media devices in class. In other words, the aspects for which this behavior collaborates positively to the development of the educational goals, and the ones that are harmed by the same behavior – the opportunities and threatens instructors identify on students' media use and multitasking in classrooms.

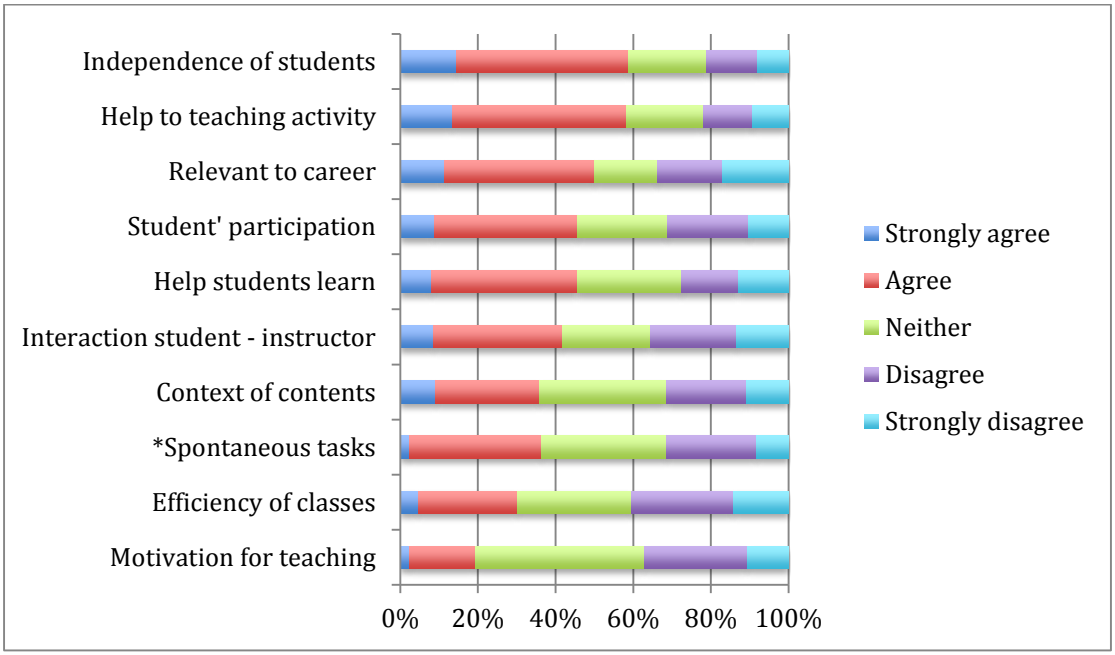
Before instructors answered the questions about their ideas and actions concerning students' media behavior in class, they were asked which devices they would consider when answering, since there was the possibility that instructors see different media devices impacting the educational environment in different ways. The majority of respondents considered the use of devices in general (75%), whilst 16% considered only laptops, 6% smartphones, and 3% considered tablets. Therefore, the following results are shown in general, not making any separation among the groups that considered different devices.

The first research question aimed to discover "*what are the implications to the educational environment that university instructors identify in the students' media use behavior in classrooms*", which was answered partially with the impacted aspects extracted from the interviews and the literature review listed in the qualitative findings (see Tables 3 and 4). The quantitative analysis made it possible to verify what are the elements in which most instructors perceive positive and negative impacts, thus revealing their implicit attitudes, that is, instructors' ideas and feelings towards students' media behavior, what RQ2 is concerned with.

The elements in which instructors most recognize the positive impact of students' media use and multitasking behavior in class are shown in Figure 5. On the top of the list, 59% of instructors identify the aspect of independence of students, that is, the possibility students have to look up for information, clarification, and examples about the content worked, without the need to depend on the teacher to answer everything in class. The second most recognized element positively impacted is the help to the teaching activity (58%), since having students with devices in class allows instructors to use online resources, computer programs, and ask students to accomplish a variety of tasks with their devices in class. Half of the respondents (50%) recognize that the use of media devices is part of students' future careers in their field; therefore working with these devices is relevant in their courses at university as well.

In the sequence, students' participation is considered to be impacted positively by 46% of the respondents, followed by help it offers for students to learn in class (45%), and contribution to enhancement of the interaction between students and instructors (42%). Having students using media devices is considered to be a resource for instructors to show how the contents worked in class apply to reality, and also for instructors to improvise in class by proposing activities spontaneously by 36% of surveyed instructors. Efficiency of classes (30%) and motivation for teaching (19%) are the aspects least recognized as being affected positively by students' media use in class.

Figure 5: Recognition of aspects positively impacted by students' media use in class.

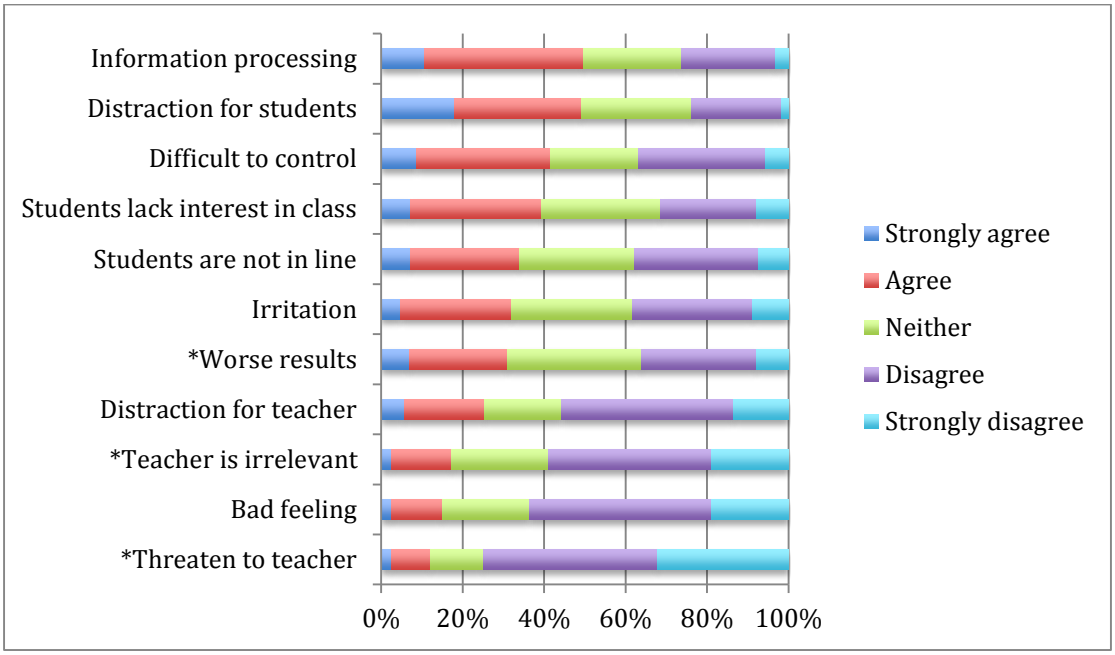


Number of cases range from 120 to 127. *Variable excluded from index building.

The aspects in which the negative effect of media multitasking of students in class is most recognized are shown in Figure 6. The elements of students' ability to think deeply and reflect on the information worked in class, and students' attention during classes, are considered to be impacted negatively by 49% of respondents. 42% of instructors identify students' media multitasking behavior in class makes it harder for the instructor to control the learning environment; whilst 39% get the feelings from this students' behavior that students are not interested in the class, and that they are not in line with the teacher in terms of objectives and purposes for the class (34%).

Besides this, 32% agree that this behavior causes irritation in instructors for the distraction it creates on students, 31% see a negative impact on students' results in exams and evaluative assignments, and 25% indicate that having students' multitasking with media during classes causes a distraction to instructors themselves. The aspects where a negative impact is least recognized are the feeling that the teacher is not so relevant in class (17%), a bad feeling in the instructor in general (15%), and that media devices use is a threaten to the teacher (12%).

Figure 6: Recognition of aspects negatively impacted by students' media use in class.



Number of cases range between 116 and 127. *Variables excluded from index building.

In general, more instructors recognized the aspects on which students' media use and multitasking behavior in class has a positive impact than the ones on which it has a negative impact.

As a positive contribution of students' media use in class, instructors recognize that students can be more active in class, looking up for information independently and using tools in their devices to help them learn. On the other hand, the potential to harm attention and the concentration necessary to go on a reflexive process are the most recognized negative impacts. These two sides of the same behavior being recognized as both an opportunity and a threat might be connected with what was said by interviewees in the qualitative phase of this study, that the profile of the student determines the impact the use of media will have.

As media devices are highly personalized through applications and access to content of one's interest, students who have intentions of taking advantage of the class can use it for learning in many ways. Conversely, students who come to class with other interests will have many opportunities to be connected to other spheres through their devices, consequently absorbing their attention, which might originate the feeling in instructors that the student is not interested in class and is not in line with its goals.

Probably the relationship between users and devices is clear to many instructors, that it mainly depends on the student to explore the potential media devices use has to produce either positive or negative impacts, what might be associated to the fact that most instructors do not consider these devices as a threat nor determinant for them to feel bad in their position, neither doubt on the relevance of their role as instructor, since these elements were the least recognized from the negatively impacted aspects.

The help it brings to teaching was recognized as positively impacted aspect by almost 60% of instructors, which involves the opportunities of showing context of contents and conducting spontaneous tasks, although less respondents recognized these two elements, since they are more specific points. This reveals that the help it may offer to teaching activities is broad, and can be done in different ways. As students can personalize the use of media devices to help them learn, teachers also can personalize it to develop activities in class and collaborate to the teaching activity.

The following section discusses instructors' attitudes, complementing the results already presented regarding what instructors think and how they feel towards students' media use in class, by displaying the findings concerning the actions instructors adopt to deal with this behavior in their classes.

4.2.4 Instructors' attitudes toward media multitasking in class

The second research question '*How favorable are instructors' attitudes concerning students' media use behavior in university classrooms?'* sought to verify the position of instructors concerning students' media use in class; what they think, how they feel, and how they deal with it.

The opinions and feelings of instructors constitute their implicit attitudes, which are represented in this study through the variables concerning aspects impacted positively and negatively by students' media use and multitasking behavior, presented in the previous section (see Figures 5 and 6). A factor analysis was conducted in order to examine which dimensions of attitudes are measured by these variables. The results allowed the separation between the positive and negative components.

However, the variable 'Spontaneous tasks', which was considered from the qualitative interpretation of the interviews as a positively impacted aspect, in the factor analysis showed a higher negative loading in the negatively impacted group. As this classification could not be plausibly explained, the variable was excluded from index building. The variable "Worse results" showed almost the same loadings in both groups; therefore it was excluded from index building. Although the variable "Distraction for students" also had similar loadings in both groups, it was maintained for index building of the negatively impacted aspects, since this element was broadly mentioned by the interviewees and on the reviewed literature. The variables 'Teacher is irrelevant' and 'Threaten to teacher' appeared with loadings on a third factor, for which there was no evident explanation, thus these variables were also excluded from index building.

After the exclusion of these variables, the factor analysis was conducted once again and a two-factors solution was obtained. The loadings of the variables in the two components extracted are shown in Table 7, corresponding to the separation between the positive and negative groups.

Cronbach's alphas for the 9 items of the positive group and the 8 items of the negative group were .93 and .90, respectively. Recognition of positively impacted aspects had a scale from 1 to 5, where 1 corresponded to the most recognition of positivity and 5 to the least recognition. The scale of recognition of negatively impacted aspects ranged from 1 to 5, where 1 was the most recognition of negativity, and 5 the least recognition.

Besides this, the 17 items of the positive and negative groups were combined to originate an inventory representing the implicit attitudes, which was found highly reliable ($\alpha = .94$). Prior building the index, the scales of the variables from the positive group were reversed, so that the scale for the new variable representing implicit attitudes could range from 1 to 5, where 1 corresponds to the most negative attitudes and 5 to the most positive.

Table 7: Factor analysis results - loadings of variables on the components of positively and negatively impacted aspects.

	Components	
	1 - Positive	**2 - Negative**
Interaction student-instructor	.854	
Context of contents	.849	
Help students learn	.819	-.350
Help to teaching activity	.799	
Students' participation	.774	-.414
Relevant to career	.744	-.328
Efficiency of classes	.657	
Independence of students	.647	-.343
Motivation for teaching	.646	-.497
Distraction for teacher		.817
Students lack interest		.816
Irritation		.776
Bad feeling		.761
Students are not in line		.723
Difficult to control	-.308	.681
Information processing	-.411	.638
Distraction for students	-.482	.561
Eingenvalue	9.70	1.98

Principal component analysis with varimax rotation. Explained variance = 65%. KMO = .912, $p < .001$.

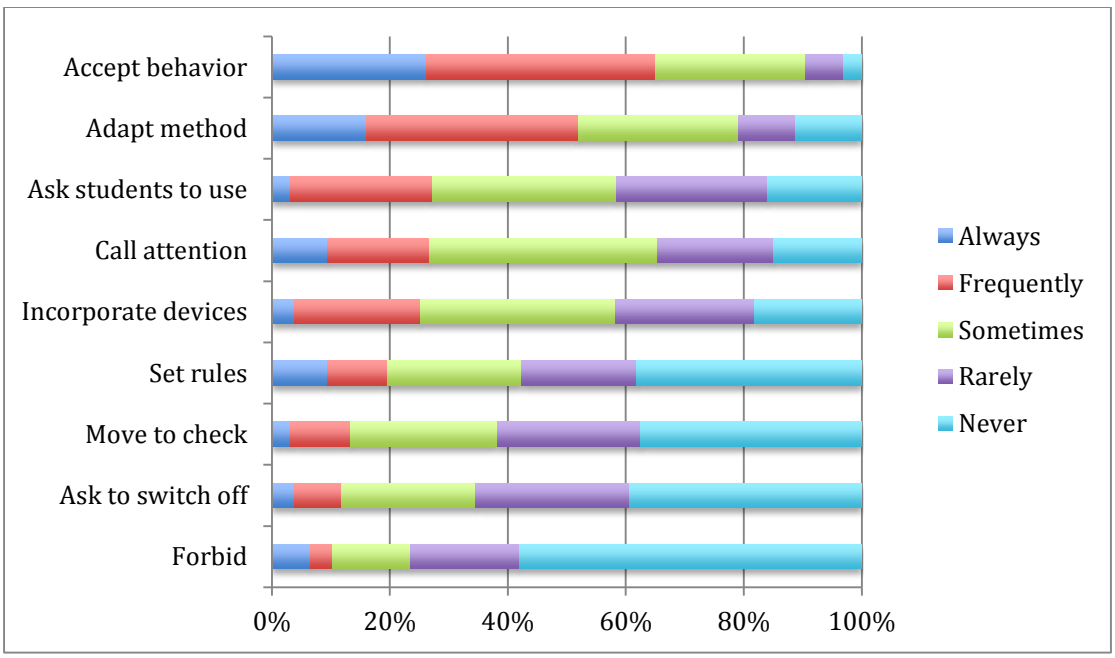
In terms of actions, that is, behavioral attitudes instructors adopt concerning their students media use and multitasking in class, Figure 7 shows that the acceptance of this behavior as a trait of present generations, thus something normal in society today, including in classrooms, is the most frequent behavior, with 65% of respondents affirming to have this position always or frequently in their classes. In the sequence, 52% of instructors mention they normally adapt their method of teaching to make their classes more interesting and win their students' attention.

Some of the ways instructors make this adaptation might be by asking students to use their devices in class to accomplish tasks, and incorporating devices in their teaching methodology, since those were actions that 27% and 25% of respondents, respectively, indicated to use in a regular basis. Also, 27% of instructors always or frequently call their students' attention verbally when they believe the multitasking is not acceptable in determined moments of the class. Thus, it is possible to see that even the majority accepts this behavior, as aforementioned they also recognize it has

potential to cause negative effects in class, like distracting students, therefore they make an effort to make their classes more attractive, but also call attention verbally when they judge necessary to prevent the negative effect of this behavior.

Calling students' attention verbally would be a milder action to control students' media use in class, compared to actions like setting rules to media use in class, which is commonly adopted by 20% of instructors; moving around the class to check what students are doing in their devices, always or frequently used by 13%; asking students to switch their devices off in determined situations, adopted by 12%; and forbidding the use of devices in class, which would be the most strict action against multitasking behavior, used by 10% of respondents. It expresses that the strictest actions against students' media use in class are the least frequent adopted by instructors.

Figure 7: Actions taken by respondents to deal with students' media use in class.



Number of cases range between 125 and 136.

The instructors who adopt the policy of forbidding media devices in their classes justified their resolution mainly for the distraction it causes on students, and the fact they consider media devices not relevant to the area they teach.

In order to run further tests, an index was built from the variables representing behavioral attitudes. Therefore, prior index building, the scales of the variables that

favored multitasking behavior (accept behavior, adapt method, ask students to use, and incorporate devices) were reversed. The behavioral inventory consisted of 9 items ($\alpha = .74$), with a scale from 1 to 5, where 1 corresponded to the most negative behaviors, that is, the actions against students' media use in class; and 5 to the most positive behaviors, that is, actions favoring media use in class.

A Pearson correlation coefficient was conducted to verify the relationship between implicit and behavioral attitudes, which were found to be positively correlated, in a moderate degree, $r = .43$, $p < .001$. There was a weak negative significant correlation between recognition of positively impacted aspects and behavioral attitudes of -.26 ($p < .01$), whilst the correlation between recognition of negatively impacted aspects and behavioral attitudes was moderately positive ($r = .50$, $p < .001$). Thus, the strongest association is found on the recognition of negatively impacted aspects of the educational environment with the tendency to adopt actions to control students' media use behavior in class; the more instructors recognize the negative aspects of students' media use behavior in class, the more they tend to adopt actions to control this behavior.

Results of implicit attitudes show that instructors recognize both the aspects positively and negatively impacted by students' media use in class, but in general, the positive impacts received more recognition than the negative ones, what is consistent with the results of the behavioral attitudes that show actions of acceptance and favorability of media devices use in class are the most adopted by instructors. Attitude consistency was also evidenced by the correlation found between implicit and behavioral attitudes.

4.2.5 Possible influencers of instructors' attitudes

The third research question aimed to verify *'which instructors' characteristics influence their attitudes towards students' media use behavior in university classrooms'*. Therefore, the associations of potential influencers with attitudes were tested. Pearson correlations were conducted to verify the relationship between (1) attitudes – behavioral, implicit, recognition of positively impacted aspects, and recognition of negatively impacted aspects; and (2) instructors' characteristics –

generation, ownership of media devices, teaching experience, and use of lecture as format to teach classes.

The first hypothesis stated that instructors who belong to younger generations have a more favorable attitude towards students' media use behavior in university classrooms. Correlations between the variables representing attitudes with generation were found to be very weak and nonsignificant: implicit attitudes r = -.10, p = n.s.; recognition of positively impacted aspects r = .16, p = n.s; recognition of negatively impacted aspects r = .01, p = n.s.; behavioral attitudes r = .00, p = n.s. Thus, age does not have an impact on attitudes towards students' media use in class as it was assumed. Therefore, the first hypothesis could not be confirmed.

It is plausible that age by itself does not influence attitudes concerning media devices use in class to be favorable or unfavorable, but the characteristics associated to the generations do. According to the reviewed literature, different characteristics in terms of attention, information consumption and multitasking behavior are found comparing younger and older generations (Prensky, 2001; Hayles, 2007; Carrier et al, 2009). However, as no relations were found between generations divided by age and attitudes in the group tested, it is possible that instructors belonging to older generations might also have been adapted their characteristics, or even if those have been maintained, they might have been developed a better understanding about the characteristics of the younger generations and their relationship with media devices. Thus, how old instructors are do not determine their characteristics neither their attitudes concerning media devices.

Secondly, it was hypothesized that instructors who own more media devices have a more favorable attitude towards students' media use behavior in university classrooms. A weak positive correlation was found between implicit attitudes and amount of devices possessed (r = .21, $p < .05$); with the recognition of negatively impacted aspects having a slightly stronger correlation (r = .22, $p < .05$) than the recognition of positively impacted aspects (r = -.18, $p < .05$) with devices possessed. The relationship between behavioral attitudes and devices possessed was not significant (r = .15, p = n.s.). Even though correlations are weak, there is a tendency that the more devices an instructor possesses, less unfavorable will his or her ideas

and feelings towards students' media use in class be. Probably the more acquainted they are to media devices, less resistant they are towards students multitasking in class, which goes in line with the second hypothesis.

The third hypothesis says instructors who use the lecture as the main method of teaching have a more negative attitude towards students' media use behavior in university classrooms. Implicit attitudes and use of lecture were found to be weakly negatively correlated, r = -.23, p < .01. Recognition of positively impacted aspects showed a weak positive correlation with use of lecture, r = .25, p < .01; whilst the correlations with the recognition of negatively impacted aspects and with behavioral attitudes were not significant, r = -.14, p = n.s.; r = -.04, p = n.s., respectively. These results show a tendency on the way that the more instructors teach their classes in lecture format, the less positive their perception about students' media use and multitasking in class will be, which goes in line with what was hypothesized.

The fourth hypothesis stated that instructors who have less time of experience in teaching have a more negative implicit attitude towards students' media use behavior in university classrooms. Correlations between implicit attitudes in general, as well with recognition of positively impacted aspects and with recognition of negatively impacted aspects and teaching experience were found to be very weak and nonsignificant, r = .05, p = n.s.; r = -.05, p = n.s.; r = .00, p = n.s. Thus, as in H1, time and the characteristics assumed to be associated with it, do not influence instructors' attitudes. In this case, years of experience in teaching cannot be considered an influencer, so not confirming the assumptions of the fourth hypothesis.

Furthermore, additional tests were conducted comparing groups from different countries and areas of science. As most of respondents teach in universities in Germany and Brazil, an independent samples *t test* was performed comparing the attitudes of these two groups. The group of respondents from Brazil had a higher score for implicit attitudes (M = 3.41, SD = .62, n = 36) than the group from Germany (M = 2.77, SD = .81, n = 70), t(104) = -4.113, p < .001, two-tailed, which indicates the group from Brazil had a more favorable implicit attitude than the group from Germany. This points to consider that factors such as cultural values and educational systems might influence instructors' attitudes concerning students' media use and

multitasking in classes. When comparing fields of science, the results of independent samples *t test* with respondents teaching Social Sciences and the ones working in Technological Sciences show a small and nonsignificant difference between the scores of the two groups: Social Sciences $M = 3.19$, $SD = .73$, n = 36; Technological Sciences $M = 3.03$, $SD = .86$, n = 31, $t(65) = .818$, $p =$ n.s.

In summary, it was found that implicit attitudes had associations with one of the personal and one of the professional instructors' characteristics tested, devices possessed and use of lecture, respectively, indicating a tendency in the direction of two hypotheses stated (H2 and H3). As attitudes are inner constructs (Eiser 1994, Fazio & Olson 2003), it is complex to explain how they are developed, since a variety of factors may influence them to be favorable or unfavorable in relation to a stimulus. This study tested only two professional and two personal characteristics of instructors that were considered to have potential to be related to attitudes, however many other characteristics and factors may be considered, for example different education systems and cultural variables, suggested by the difference found between countries.

4.3 Comments of instructors

Besides answering closed ended questions, instructors had the opportunity to leave a comment about their experiences and/or perceptions about students' media use and multitasking in their classes. A total of 51 comments were left by respondents, most of them remarked two aspects: (1) the use of media devices are normal, and/or can help teaching and learning, revealing attitudes of acceptance and/or enthusiasm concerning media use in class by students; and (2) the potential of distraction it has, and even recognizing the potential to collaborate positively, instructors see many students do not use it for learning, but mostly for having fun. The social networks activities and Facebook directly were cited as thieves of attention through media devices in class.

Most comments express acceptance of media use by students in class, however there were comments highlighting the importance of managing this students' behavior in order to control distraction and profit from the potential media devices offer, as one

instructor commented: “I consider students’ use of devices as part of their learning. However, regulating their use in the interest of better learning in other practices is part of this learning process” (Case102).

In the survey, 60% of respondents agree that students have a sort of addiction for media devices, and 52% agree that the students who misuse or overuse media devices in class lack maturity to realize some moments are not adequate for it. These topics are reiterated by some comments, mentioning that the relationship that part of the students have with their media devices is associated to addiction and to immaturity, which was also declared by interviewees in the qualitative phase.

A few comments stated that media devices simply do not fit in mathematics driven courses, what suggests that it is more difficult to incorporate media devices in certain subjects; or that some instructors do not see how to teach classes in a different way, in a way that students have the possibility to use devices as a resource, for example. One instructor commented that adopting classes in a more problem oriented format has been showing good results, because students get involved and can use their devices to help them, which is also closer to the reality they will face after school, so it is pertinent to train students how to use media devices for academic/professional purposes in university classes. Another instructor commented that teachers should be more interested in searching and adopting apps that could contribute to the subjects they teach.

According to several comments, the use for the good or for the bad depends mainly on the intentions of the student who is using the device: “The advantage or disadvantage of use of media in a classroom depends on the personality of a student: it is useful for some students and some students feel distracted” (Case 41). This sentence summarizes well the perspective of many instructors, and with the comments left by part of the respondents, reinforce the results previously presented, since the potential of media devices use is recognized both for contributing positively to the class and for distracting students and harming their ability to go in a deeper reflection process, depending a great deal on the student - the user, to make of it an opportunity or a threat to the educational environment.

5 Discussion

This study aimed to explore instructors' perspective about the implications that students' media use and multitasking in university classrooms brings to the educational environment. Therefore, instructors ideas and feelings regarding this behavior were verified, revealing a set of aspects that instructors perceive being impacted either in a positive and in a negative way by having students multitasking with media during classes. Besides this, it was possible to check how favorable instructors are about this practice, understanding better what they think, how they feel and how they deal with it, finding that most instructors nurture favorable attitudes. Finally, the relations between instructors' personal and professional characteristics with their attitudes were analyzed, and associations were found with amount of devices instructors own, and use of lecture as format to teach classes.

In terms of aspects impacted, most instructors recognized the positive impact on the independence students have to look up for information on their devices during the class without the need to ask the instructor; and that having media devices in class help students in their teaching activities. On the other hand, the ability of students to engage in a deeper reflection process of the content worked in class, and on the attention of students, distracting them from the activities of the class, were the negatively impacted aspects most recognized by instructors. In terms of actions, most instructors indicate an attitude of acceptance, agreeing that media use is a normal behavior in today's society in many spheres, including classrooms.

Instructors' implicit and behavioral attitudes reveal they recognize both the opportunity and the threat students' media use in class represent. The line between the bright and the dark side of media use in class might be mainly the owner, in this case, the student. According to what was mentioned by instructors in the interviews and on the spontaneous comments left on the survey, students will adopt media devices in accordance to what they intend in the class; students who are interested in learning will use it for learning, and the ones who are not interested, will virtually escape from the class through their devices.

When it comes to what influences instructors' attitudes, it can be considered that the tendency that portable devices become more popular in general contributes to the understanding of the dynamics of these devices use. As it was shown, the majority of instructors surveyed own at least two media devices, despite their behavior might be not so intensive as young generations', when instructors themselves develop a personal relationship with their media devices they might understand and accept better the relationship students have with theirs, what might contribute to the presence of the media devices in class being accepted, in general. However, the point of conflict lies on the intensity of this behavior and in the use in inadequate moments, as the majority of instructors agree that students in many cases are addicted to media devices and lack maturity to realize in which moments these devices should be left aside.

Still, understanding why some instructors are more favorable and others are more unfavorable to media use in class is a complex task. Although relations were found with ownership of media devices, use of lecture, and differences were found between different country groups, many other aspects might influence instructors' perceptions.

As instructors declared that the positive or negative impact of media use in class depends a lot on the student, it is pertinent to consider the nature of the relation users develop with media devices. The attribute of being portable, that is, having the possibility to accompany the user practically everywhere, and the personalization they allow in enabling the user to install applications and accessing contents according to their necessities and interests, make portable computers, smartphones and tablets very personal. More than ever, media are working as extensions of men (McLuhan, 1964), so that users are able to make from media devices what they want, reinforce with them their intentions, showing their inclinations more evidently. In educational environments it will not be different, the presence of media devices in class accentuate the independence of the student, their free will of being either extremely connected with or extremely distracted from the class. So interfering in this relationship between student-users and their devices might be a challenge for the instructor in classrooms.

However, when instructors appraise students' media use and multitasking in class on the primary level, which according to Schutz and Lee (2014) relate to goals and results of the activities in class, it is identified on the comments left by some respondents that for many instructors their priorities are stimulating learning, analyzing the goals of the course and of each class, and to what extent media devices fit in the educational environment to contribute for the educational goals being achieved. Moreover, some instructors consider that the presence of media devices is growing exponentially in diverse environments of society, thus it makes sense that students develop abilities to use media devices for the purposes of their area of studies for future professional activities. This way, the professional use of media becomes one of the competences to be developed in classes.

On the secondary level of appraisals, referring to how able the instructor feels to handle what is happening in class, the attitude of acceptance declared by most instructors reveals that, even if they do not stimulate the use of media devices in class, they understand it is up to the student to profit from the class or to be disconnected to it, and mostly respect the student's option, and perhaps this way relieve the burden of needing to have students fully under control. Therefore, having students using media devices in class does not affect the professional esteem of instructors, in general, since the majority of surveyed instructors do not agree that it causes them to feel threatened, irrelevant, nor bad.

In order to manage classrooms with intense media use, it is relevant to take into account that media devices offer the possibility to transport people to other environments than the one where they are physically present. As Carrier et al (2009) says, online spheres are part of the social world of younger generations. This transportation will happen in the classroom environment, and the instructor, as responsible for the goals of that environment, periodically will need to bring their students to the reality of that physical moment, through means of actions instructors indicate to adopt, not only to control the behavior, like regulating students' media use, setting rules or calling their attention verbally, but also to conduct the behavior to go in line with the goals of the class, by involving students in the moment. For example, moving in the direction of active problem oriented format of classes, in situations where students are allowed to use media devices as they prefer to achieve the goals

proposed in class, which is in accordance to a more personalized learning, as recommended by the report of The Economist Intelligence Unit (2008), and Norris et al (2011).

On the other hand, the perception of media use and multitasking as a prevalent behavior, and the attitude of acceptance assumed by most instructors do not make from it a sacred behavior. When there is the clear conviction that devices are not part of the educational moment or are disturbing the group, instructors assume the position to control it, like they normally would suppress any other disturbing behavior in class, for instance, loud talks.

Since this study collected perceptions and actions taken by university instructors to contribute to the analysis of how students' media use behavior in class impact educational environments, it was possible to realize there are many aspects to be considered, therefore it is not possible to recommend a standard attitude nor a formula for instructors to deal with it in their classes. However, it is possible to draw topics for educators to put attention and consideration. First, the importance of understanding that the responsibility of producing either profit or harm from media use in class lays a great deal on the student. The instructor's responsibility consists of planning and conducting the educational environment, its goals and activities, which may in some moments demand the management of students' media use behavior.

Furthermore, it can be recommended that instructors devote some attention on analyzing how to profit from students' media use behavior, in and out classrooms. In terms of working information, it is clear that access to data is broad through media devices, and students can do it independently. However, consuming information is different from applying and processing it, where students seem to have the most difficulty when multitasking with their devices, according to instructors. In this point the intervention of the instructor might be fundamental: more than providing information, instructors may honor stimulating students to process it, to reflect and work the contents searched. Moreover, the same way students multitask with non-academic activities in class, instructors may profit from the situation on the other way around, and make it possible for students to multitask with academic activities in

other situations outside the class, by using a variety of online tools, such as video channels, forums, and social networks.

Communication processes are everywhere in society, through media or the most basic interactions among senders and receivers. Communication science can contribute considerably to education, as it has been doing in many other spheres. Understanding media effects on educational environments is believed to be a contribution, since it is an important step for instructors to be aware of the new challenges of their role, and thus collaborate to shape education in a more effective way.

5.1 Limitations and further research

The first limitation of this study was the adoption of a convenience sample, which did not allow definite results to be drawn, instead offered inputs for contributing to the discussion in the area and for further studies. This investigation did not take into consideration the specificities of different fields of science nor the university education reality in different countries, factors that could help understand to what extent media devices use fits in university classrooms. Besides this, for time limitations, it was not possible to collect data from a large number of cases. A larger sample, more equally distributed among areas of science and specific countries/regions could have allowed further comparisons and generated more input.

Moreover, personal and professional characteristics were measured through single aspects. Familiarization with media was evidenced by ownership of media devices, which is only one factor that may contribute to a person be familiar with media devices, however a person can possess only 1 or 2 devices and master them as well and have a deep understanding of media technology as people who own 4 or 5 media devices. Also use of lecture as teaching format is only one aspect of pedagogic approach, which involves many other actions an instructor uses concerning the contents he or she teaches, and the students he or she works with. So an instructor might use lecture to teach a great amount of classes, but still may establish a dialogical classroom environment and get students involved. Even though it was

found associations between devices possessed and use of lecture with attitudes, results could go stronger in this direction with a more precise measurement.

In terms of attitudes, it was not differentiated cognitive from affective, so those dimensions were analyzed together. If the dimensions could be better limited, it would be possible to conduct a more precise assessment.

In addition, having a survey as instrument of data collection might offer the risk that instructors underestimate the frequency of their actions or the prevalence of students' media use behavior in class. Also, aspects inquired might have been interpreted differently, since the survey was administered in English language, and the majority of the sample consists of respondents from Germany and Brazil, even though the questionnaire structure was based on interviews and was pre tested and discussed with experts from these countries.

Due to the complexity of the situation, in depth interviews could offer more resources, especially if associated to observations of the educational environment where interviewees are inserted and to some sort of assessment of their students, what would approximate to an ethnographic study. This way, it would be possible to have a more comprehensive perspective of the elements involved and impacted by media use in education. However this would demand a complex research design and much time.

Furthermore, in depth interviews with experienced teachers could be relevant to investigate the changes the introduction of media devices in classroom brought and thus understand better the implications it brings, by comparing the educational environment before and after, having an understanding on how the process happened and how instructors have dealt with it.

Although perception of prevalence was not the focus of this study, future investigations may compare actual media multitasking behavior of students in class to what extent instructors perceive it. Also positions of students and instructors concerning the impact of media devices in class can be compared.

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Appendices

A. Interview guideline

1. Introduction
   General purpose of study
   Clarify Media Multitasking idea

2. Professional profile

   - Age
   - Location
   - Academic background
   - Field of teaching (general and specific)
   - Years of experience in teaching
   - Have you worked for different institutions and programs?
   - How many hours a week do you have in class?
   - Currently, how many students do you have (approximately)?
   - What do you consider to be the most challenging things in the classroom environment?

3. Personal media use

   - Which media devices do you use the most?
   - Do you multitask with media throughout your day? Can you give me some examples?

4. Cognitive attitude towards multitasking in class

Main Question	Additional question	Possible aspects
1. Do you ever perceive your students consuming media while you are conducting activities in class?		Yes No
	Which media?	Smartphone Laptop Newspapers Books
	In which class?	Lectures Seminars During presentations During discussions
	How often?	Almost all classes Frequently Occasionally
	How big is the group who uses media in class?	Most of the class About half of students Only a few cases

2. Media Multitasking is considered a growing trend especially among youngsters. Do you see this phenomenon happening throughout your years of experience in teaching?		Recover years of experience in teaching
	If yes, would you say students used to be more focused on class or did they have other kinds of distraction?	
3. What do you think about students bringing and using their devices while in class?		Positive Negative
	What do you think is the outcome of multitasking with media in classrooms?	+/- for student learning +/- for instructor work +/- for relationship instructor and student

5. Affective and Behavioral attitude towards multitasking in class

Main Question	Additional question	Possible aspects
1. Do you have the feeling that students with laptops in class are mostly distracted or mostly in line with class activities?		
2. Can you distinguish when students are using laptops for class purposes or for something else?		By their expressions By the kind of student By their engagement in class
	How do you feel when you see your students with their laptops in class?	Normal Frustrated Annoyed Distracted Uncomfortable
	What do you think they are doing on their devices?	Class related activities Searching for information Playing games Chatting Facebook E-mail
3. Do you ever suggest / request students to use their laptops in class?		Searching for information Accomplishing a task Using a specific program
4. What about students		

using cell phones or smartphones? How do you feel about it?		
5. Why do you think they use these devices in class?		They use it to take notes They use it to consult material / follow the class Class is not interesting enough They are tired They are bored They are addicted They do not like the class/instructor
6. Do you consider in general that media devices in class are mostly helpful or mostly harmful?	Why?	Tools and resources Distraction Class dynamics Teacher's motivation Students' results
7. In an ideal situation, how do you think these devices could contribute to your classes?		Ubiquitous computing Proper programs Student behavior
8. Have you ever somehow asked your students to switch off any devices or had the need of making any similar restriction?	What was the situation? What would be necessary to happen for you to take this action?	

B. Interview transcripts

Acronyms used in the transcripts:

P = Interviewer (researcher).
I1 = Interviewee 1.
I2 = Interviewee 2.
I3 = Interviewee 3.

Interview 1

P: Quanto tempo tu chegaste a lecionar?
I1: 4 anos e meio antes de eu pedir afastamento, né, porque agora em afastamento, teoricamente, estou vinculada à instituição, mas depois vamos ver. São 4 anos de doutorado, 3 anos e meio de afastamento se eu fizer todo o curso, então não sei se eles vão me liberar tanto tempo.

P: E sempre foi na Unifra? Ou tu chegaste a mudar?
I1: Na Unifra. Eu pensei assim... Eu tive a oportunidade de mudar. Mas eu pensei, acho que vou me consolidar um pouco mais na instituição, até porque tinha várias coisas, como o plano de carreira agora existe, sempre existiu, mas agora pelo jeito é bem melhor. Daí eu pensei nisso. E foi bom assim, porque é legal, pelo menos na minha visão, trocar essa possibilidade de variabilidade pela possibilidade de adaptação, crescimento, que quanto tu troca de instituição muito frequentemente, eu tenho amigos que fazem isso, tu não consegue ver.

P: Claro. E quando se fica mais tempo, acabam surgindo possibilidades além de sala de aula muitas vezes.
I1: Isso, projetos de pesquisa, a possibilidade de trabalhar numa pós...

P: Isso deve valer bastante a pena, com certeza. Não sei se tu lecionava disciplinas de diferentes assuntos...? Em qual área?
I1: Eu tenho bem detalhado isso no meu Lattes, pode dar uma olhada lá. Mas que eu me lembre, as mais frequentes eram Telejornalismo, Edição em Telejornalismo, porque eu fiz alguns freelas antes de entrar na Unifra, trabalhei na TV Universitária, segui trabalhando na TV Unifra, e hoje minha pesquisa é nessa área, sempre estive bastante vinculada a essa área em pesquisa também. Apesar de eu ter trabalhado em rádio, paralelamente à coisa de ser professora e tal, eu acabei nunca lecionando nada de rádio.

P: Mais TV?
I1: Mais TV e trabalhei algumas coisas teóricas, disciplinas teóricas, até voltadas à elaboração de projetos de pesquisa, onde é muito necessário que eles estejam atentos e é onde eu frequentemente via também esse processo de compulsão por redes sociais.

P: Isso é interessante. Se eu entendi bem, tu dava aula em laboratório e em sala de aula.
I1: Isso, exatamente.
P: Isso é interessante. Imagino eu que no laboratório não acontecia tanto isso.
I1: Acontecia muito mais.
P: Sério?!
I1: Laboratório, laboratório, literalmente, onde nós temos os computadores, né, porque a questão do laboratório é você fazer uma atividade laboratorial para que os alunos tenham uma experiência, para se colocar em prática uma técnica, coisa assim. Isso é um laboratório. Mas no laboratório, fisicamente laboratório, com os computadores e toda aquela aparelhagem, era pior, porque apesar de eles fazerem as atividades, como um script ou a evolução do projeto, tinha a conversa com o colega, tinha trabalhos em dupla, em grupo, é muito pior, porque eles estão ali ligados, eles não estão nem com a wifi ou iPhone m estão, no smartphone lá deles, é no computador mesmo, ali na tela onde eles trabalhando, com várias janelas abertas, ...
I1: Fica difícil de resistir, então.

P: E mais ou menos quantos estudantes tu tinha por semestre, em geral?
I1: Variava. Mas eu tive turmas assim de 30 e poucos nas disciplinas mais teóricas, tipo Comunicação e Filosofia; e Projeto de Pesquisa talvez entre 20 e poucos, 30 e poucos. E nas disciplinas mais práticas, tipo todas as teles, nessas mais de laboratório, de trabalho mais prático, eram entre 15, 18, variava assim, né.

P: Entendi. E quantas horas por semana mais ou menos tu tinha em classe?
I1: Meu contrato era de 40 horas semanais. Mas em aula, umas 14 horas aula eu acho. Entre 14 e 18 horas.
P: Aham. E tu achava tranquilo essa carga horária?
I1: Eu acho bastante. Para mim era interessante porque eu queria ter essa experiência. E eu tava assim, querendo ter ideias, apesar de eu estar ali querendo escrever meu projeto de doutorado, e nunca tinha uma ideia, eu achava que naquela convivência, eu iria observar coisas que me fariam atentar para algo. E realmente aconteceu, sabe? Foi que nessa experiência, nessas discussões com esses alunos assim, que eu acabei amadurecendo uma ideia de como eu poderia trabalhar no projeto. Foi bem intenso, assim.

P:E quando tu terminar o doutorado provavelmente tu vai voltar a lecionar, certo?
I1: Eu gostaria de trabalhar com pesquisa, mas como não é só de pesquisa que se vive, então eu teria que lecionar.
P: Sim, entendo. Mas quando tu voltar a lecionar, tu estaria ok com a mesma carga horária? 12, 14 horas? Ou tu acha muito? Gostaria de lecionar menos e se dedicar mais à pesquisa? Assim, hoje, como tu avaliaria tua motivação para trabalhar como professora?
I1: A minha disposição para trabalhar com isso, eu acho que ela não é maior,
mas eu acho que é uma disposição mais, como vou te explicar, eu me sinto mais embasada. Como um conhecimento mais diversificado. E eu realmente gosto do que eu fiz. Se eu quero seguir, eu não posso ser hipócrita e pensar que ah, eu com o doutorado tá tudo bem, eu posso ficar tranquila. Eu realmente investi nisso porque eu tenho interesse em fazer uma coisa melhor, sabe, como professora. Eu me sinto assim, ainda, num processo, que eu tenho que descobrir muitas coisas, aperfeiçoar outras, mas eu me sinto bem motivada.

P: Ah, que ótimo. Isso é muito bom! E o que tu avalia, nesses 4 anos que tu lecionou, quais as coisas mais desafiadoras no ambiente de sala de aula?
Coisas assim que de repente alguns dias te fizeram pensar "o que que eu tô fazendo aqui? Vale a pena?"
I1: O que mais me fazia parar e pensar naquilo que era mais desafiador... Era a incapacidade talvez minha, talvez deles, de nos sintonizarmos porque eram pessoas, são pessoas, com tanto potencial quanto eu, quanto pessoas que estudam outras coisas, se aprofundam mais estudando outras coisas, mas eu vejo um potencial pulverizado assim, uma coisa que as pessoas vão aplicando assim, em vários âmbitos da vida, talvez por serem jovens, e eu não compreendia muito, porque que não havia concentração daquela maneira que nós precisávamos naquele momento. E eu não compreendia muitas vezes como fazer para captar essa atenção, entendeu? Para o texto, para a discussão, a necessidade que eles tinham de, claro no mercado de trabalho, ou mesmo numa pós-graduação, muitas vezes as pessoas foram realizando na cabeça, aquilo que naquela época a gente discutia, mas naquele momento seria bom que eles parassem e tirassem o olho do facebook, do sei lá eu o que. Mas isso era

um desafio... Era muito difícil. Outra coisa, Priscila, por se tratar de uma instituição particular, assim, a frequência com que as pessoas acham que podem fazer qualquer coisa, entendeu? Porque elas estão pagando, sabe. Talvez a infantilidade ou a imaturidade das pessoas de estarem ali fazendo o que elas se propõem a fazer ou acham que se propõem a fazer. Isso foi uma coisa bem difícil, assim. E tu ter que abrir todos os teus critérios de avaliação, passar por uma situação de constrangimento de revisão de notas, muitas vezes sabendo que aquela pessoa em relação às outras rendeu tão menos, ela não teria a mínima moral de tá pedindo aquilo ali, mas é direito, é processo, e ter que se submeter a isso é difícil, sabe?

P: É que parece que, a impressão que eu tenho é que nas instituições particulares eles têm um pouco uma política de clientelismo, assim, o aluno também é um cliente porque ele tá pagando por um serviço, eu não sei, às vezes me parece um pouco isso.

I1: Eu não sei, Priscila, mas eu avalio nesse ponto, que era o ponto que eu conseguia enxergar.

P: Entendi. E era da posição onde tu tava.

I1: Eu me chateava bastante. A gente sabe que para quem estudou em uma instituição federal, a gente muitas vezes correu atrás de muitas coisas.

P: Nossa, tinha que correr atrás de tudo.

I1: Eu me lembro quando eu comecei, era meu primeiro semestre, e eu tava com aquela coisa idealista. E muitos alunos faltaram num dia de avaliação, e eu disse assim, vocês fazem ideia de quantas vezes a gente se manifestou, a gente brigou, a gente fez abaixo-assinado, a gente fez qualquer coisa porque o professor não ia nos dar aula, vocês fazem ideia do que eu passei numa federal e vocês tão aqui com tudo, eu tô dando o plano de aula, inclusive deixando os textos no xerox. Eu não fazia mais isso, ninguém mais está de acordo em seguir fazendo isso de deixar a pasta no xerox. Vocês estão com tudo na mão, o pai paga pra maioria aqui, tem o plano de aula detalhado, tem o professor aqui todos os dias dando aula, não é porque eu estou numa particular, eu venho porque eu gosto, e vocês me faltam num momento desses? Ah, não, difícil, sabe.

P: Sim, entendi. Deu pra entender a situação. Mas deixa eu mudar um pouco o rumo da conversa. Eu gostaria de saber sobre os teus hábitos de consumo de mídia. Quais os dispositivos que tu costuma usar no teu dia-a-dia pra consumir mídia?

I1: Por exemplo, e-mails é uma coisa que eu tô toda a hora abrindo. Sites de compartilhamento, eu abro muito Youtube, eu abro muito vídeos perdidos pela internet porque a minha pesquisa depende de uma catalogação que é meio aleatória, tem programas que não têm aqui, então eu teria que ir a São Paulo buscar, porque é só em acervos específicos, eu não sei como eu vou fazer, até por isso eu restringi mais a minha pesquisa, porque tem programas dos anos 80 que não estão mais disponíveis. Então o Youtube eu abro sempre, sites como Facebook, Twitter. Eu tenho um smartphone, eu tô sempre com ele. E se eu não tô conectada assim, é porque eu to estudando, porque eu to sei lá eu lendo, me concentrando muito. Eu sou bem presente, assim. Há também os fóruns, me cadastrei em vários sites e às vezes eu perco um pouco a noção das contas que eu tenho. Mas eu não consigo, acho que é uma coisa de geração. Mas acho que é uma coisa que talvez no teu estudo tu vá observar, por eu interagir bastante pelos meios, várias mídias e tal, eu não consigo levar pra aula, não o dispositivo, o dispositivo vai, mas essa interação, aquele processo todo que se eu to em casa, to aqui fazendo meus trabalhos, eu fico ligada, deixo o skype aberto. Eu nunca faço isso, porque eu acho que os professores vão se sentir piores do que eu me

sentia com as criaturas na sala de aula. Como meus interesses de pesquisa não dependem disso em sala de aula, eu quase nunca uso.

P: Tu consegue pensar em alguns exemplos de situação onde vc combina o consumo de diferente mídias ou consome mídia ao mesmo tempo que executa alguma outra tarefa?

I1: Eu uso muito fones de ouvido, estou sempre escutando música, mas tenho o maior cuidado por exemplo para não ficar pegando com a mão suada ou engraxada, eu cuido muito dessas coisas. Mas quando eu estou fazendo minhas leituras de tese, apesar de deixar ligado, eu cuido para não abrir, para não ficar acessando, porque eu sei que eu sou dispersa.

P: Todo mundo, né. É muito fácil perder algumas horas fazendo nada.

I1: Uma vez eu tava fazendo uma conta, e eu gastava umas 2 ou 3 horas no Facebook. Ali, mil janelas, eu faço isso, né, eu to ali, me chama um, me chama outro, daí eu respondo a conversa de 2 dias que a pessoa me enviou, então eu tenho que dar um jeito.

P: Claro, às vezes é necessário uma medida drástica. Carla, voltando à questão da sala de aula. Pela tua fala se nota que tu percebeu de forma bastante comum essa situação dos alunos com os computadores ou telefones em sala de aula de forma bem comum, certo, tu percebeu este fenômeno?

I1: Sim, e eu falava pra eles, olha, se vocês perderem esse detalhe aqui, agora, se não há a possibilidade de usar isso na rede social, vocês não vão assimilar isso, porque não tem nada a ver com a rede social. Então, desliguem. Nuns casos extremos, assim, eu dizia, gente, desliga. Daí eles desligavam. Teve um caso extremo de um aluno, ele rodou inclusive, não só comigo, em TFG II, que já era a monografia, eu acho que comigo ele rodou no projeto também. Enfim, ele tinha um problema que ele era motoboy, ele dependia do celular, tava sempre ligado naquele celular, não desligava nunca, e ele ia pra orientação, e a sala era minúscula, era uns 2,5X3 aquela sala, e aquela criatura conseguia ficar caminhando em volta da mesa, bufando, olhando pro celular, sentava 5 minutos, ficava mais 5 caminhando, caminhando, ele não parava. E na aula, ele foi meu aluno em algumas cadeiras, ele não lia os textos, então a dispersão, o déficit de atenção que algumas pessoas já tem naturalmente, eu acho que potencializa com essas coisas, e ele tava num grau assim extremo.

P: Bom, quanto ao tipo de classe, tu já havia comentado, que no laboratório era mais propício a essa situação, né? E com que frequência tu notava isso? Eram em todas as aulas, era uma coisa mais geral?

I1: Então, eles iam pro laboratório quando tinha uma atividade de elaboração de projeto, e também quando havia elaboração de textos, scripts, apresentação das disciplinas de tele, e aí eles tavam fazendo as coisas no computador e com a janelinha do Facebook aberta. Então aulas que eram mais avaliativas, no sentido de vamos assistir os trabalhos, vamos comentar os trabalhos, vamos discutir, trazer a reflexão teórica, não havia esse problema, então era mais difícil de ficar conectando e mexendo. Mas disciplinas como essa de projeto era mais constante porque eles só ficavam no computador. Eu tinha um quadro, uma tela, tinha a possibilidade de tá trabalhando com powerpoint, coisas que eu levava para eles, mas aí eles assistiam a aula, tavam participando comigo, tavam com o projeto deles e tavam com a janelinha do facebook aberta, e eu acho que uma grande porcentagem de atenção da pessoa se

perde ali, porque tu tá totalmente ligado ali, tá esperando, fez um post e vê quem curtiu, falou com a fulana, vou ver se ela me respondeu.
P: Claro, se tua atenção não tá toda ali, pelo menos divide, ela tá repartida.
I1: Click click pra abrir o facebook, click para minimizar o facebook.

P: Não, realmente se perde tempo e atenção. E no teu grupo de estudantes tu percebia isso como um comportamento da maioria ou eram poucos casos?
I1: Olha, a maioria, tendo acesso ao computador naquele momento, se eu não era enfática, pedindo desliguem neste momento, às vezes também por não cogitar que naquele momento a pessoa vai estar com o facebook aberto, em muitas aulas nem me incomodava com isso, mas se eu não fosse específica e enfática, a maioria sempre deixava aberto.

P: Eu sei que 4 anos não é muito, mas igual. Eu queria saber se tu notou esse comportamento se intensificando, se tornando mais forte. Porque a tendência é que isso cresça e que as pessoas fiquem cada vez mais conectadas e até dependentes. Tu notou alguma diferença pensando no primeiro ano, qdo tu começou, até o último ano que tu deu aula?
I1: Eu acho que até a política das instituições tenha mudado em relação a isso. A gente sabe que por exemplo o jornalismo se faz através do uso concomitante de várias fontes de informação, então eu acho, que por ser o nosso curso, eu acho que isso foi sendo mais aceito, mais liberado o acesso a esses sites, porque pelo que eu lembro, havia restrições a algumas redes, que acabaram sendo liberadas.
P: Na rede da instituição?
I1: E eu acho que isso foi sendo geral, e eu acho que algumas coisas, como muitas fontes, estão pelo facebook, pelo twitter, e isso eu acho que foi tudo junto assim. Tanto os alunos com mais acesso a smartphones, se eles não estão na frente do computador, eu acho que popularizou bastante o smartphone, e as pessoas foram se familiarizando mais com o Facebook, porque no Brasil até 2009, 2010 não era tão expressivo. E daí acho que foi todo junto. Eu creio que houve um crescimento, sim.

P: Analisando assim, mais friamente, o que te causa, o que te ocorre, a respeito desta situação de você como professora, instrutora, ali, na frente da sala de aula, e os teus alunos usando os dispositivos deles. Essa situação de eles dividirem a atenção entre a aula, as atividades propostas, e o consumo de mídia ao mesmo tempo, tu acha que isso tem mais potencial como uma coisa positiva para o ambiente, para a aula, ou mais negativa?
I1: Eu detesto ficar em cima do muro, mas isso é relativo. Quando eles estão em campo produzindo a pauta, isso não quer dizer que eles estejam em campo na rua, né. Mas buscando informações, acessando gente, acessando lugares, enfim, eu acho que é muito positivo. Eu penso que é extremamente positivo, porque coisas que o repórter, o produtor antigamente tinha que buscar a pé, hoje, meu Deus. As pessoas estão muito mais acessíveis e as informações estão muito mais aí. Essas coisas de portais de transparência do governo, são coisas que poupam muito trabalho. Eu acho que é muito, muito positivo, eu até falava da questão da produção dos scripts, nossa, quantas informações são checadas ali porque há o acesso à rede. Então se produz um script com muito mais rapidez. A questão é, quando eles precisam entrar num processo avaliativo e reflexivo deste processo, desse caminho até ali, do trabalho em si, aí isso prejudica. É um momento diferente, e estando em aprendizado, eles têm esse momento quanto tanto o da produção, e isso, neste momento é extremamente

negativo, ao meu ver. Nesse momento é uma distração e uma dispersão, e é bem negativa, se não naquele momento de produção que é necessário para eles fazerem trabalho, porque aí é muito positivo.

P: Esses aspectos que você me deu agora são relacionados puramente com o estudante, com o aproveitamento dele. Se a gente pensar no teu lado, como professora, como instrutora, isso é mais positivo ou negativo, no sentido de facilitar teu trabalho ou te causar um mal estar. Como você avalia isso?
I1: Olha, eu já me senti bem, muito mais tranquila por saber que a agilidade do processo vai ser maior, e já me senti mal nesses momentos assim, não por mim, eu vivia até falando, quando eu me sentia na necessidade de dizer isso pra eles, eu dizia olha, eu to aqui, passando isso de novo, pra mim é importante revisar coisas, é legal acompanhar o trabalho de vocês, mas vocês não vão passar por essa disciplina de novo, eu acho que vocês deveriam aproveitar melhor. Então não é que me chateie, que me faça achar que é ruim, acho que, como eu te falei, essa imaturidade de não conseguir perceber o momento é o que mais prejudica essas pessoas e isso me chateia. Pelo menos dentro da minha metodologia, aí é que tá, como eu te falei, talvez eu é que não esteja integrada o suficiente nessa nova maneira de as pessoas se relacionarem com a informação e com o outro através de seus dispositivos, talvez eu precise me rever. Mas eu acho que tudo tem seu momento, sabe.

P: E Carla, quando tu via teus alunos com o laptop em aula, não sei se tu tinha essa habilidade, tu conseguia ter uma ideia de quem estava fazendo alguma coisa relacionada à aula e quem estava fazendo qualquer outra coisa? Tu conseguia de alguma forma perceber isso assim?
I1: É difícil perceber, mas ao mesmo tempo, no trabalho, no resultado daquele trabalho tu vai conseguir observar, sabe. Ao mesmo tempo, na aula, é muito interessante assim, como as pessoas são muito mais transparentes do que elas acham, né, tu vê que o cara tá ali, ha ha, como olhando fotinho e "hehehe" (imitando alguém rindo), interagindo, conversando e rindo, né. E aí tu para, eu dou uma voltinha assim, né, e aí fulano, tudo bem, como tá o trabalho aqui? Eu sempre vou dando uma olhada e acompanhando o processo da aula, daí tu percebe assim que as pessoas estavam em outro planeta, ah, tá tudo bem professora, ou quando a pessoa tava ali, buscando coisas, com mil janelas abertas, mas era do site do não sei o que, era do portal do não sei o que, tava realmente servindo como fonte. Eu vou te dizer, que assim oh, em 70% do casos não era pesquisa. E nesses 30% mais ou menos coincide com os melhores desempenhos. Nas turmas é essa média assim, 30 ou 40% é o pessoal que tá usando praquilo que deve ser.

E deixa eu te fazer uma pergunta bem baseada em instinto, vamos chamar de instinto. Qual é a primeira sensação que te dá quando tu chega em sala de aula e meia dúzia já abre o computador, ou tu chega e já dá de cara com isso.
O que tu sente? Tipo, ok, normal ou algo tipo ai, droga?
I1: É, é mais pra ai, droga.

P: Tá, e assim, mesmo não sabendo ao certo, mesma não dando a tua voltinha e constatando o que eles estão fazendo, o que que tu acha que eles estão fazendo no computador, qual é a primeira ideia que te vem?
I1: Eu acho que eles estão no Facebook. Tinha gente que estava tão perdida naquele curso, que as pessoas estavam buscando uma razão de ser, entendeu. Uma razão para

ser feliz, bom, estou aqui, tenho que vir a essa aula, então vamos lá, vamos ser felizes aqui. Elas estão buscando motivos para diversão. Em outros casos eu sabia que eram pessoas extremamente participativas e produtivas e estavam ali e eu pensava o que será que eles estão fazendo, o que será que ele está pesquisando, então isso é uma alegria, assim. Então eu não sou avessa ao uso dessas coisas, claro que não, me ajuda um monte também. Mas talvez pelo tempo de experiência, experiência com uma determinada turma, tu já vai sabendo, tu já vai montando uma pré-disposição a pensar tal coisa sobre tais pessoas.

P: Pelo perfil do estudante tu faz essas associações.

I1: Pelo perfil e ao longo dos semestres, como tu disse não é muito tempo, mas eu trabalhei diretamente 9 semestres, e foi assim, cada vez mais rápido esse processo de reconhecimento, sabe.

P: E em alguma situação tu chegou a sugerir que eles usassem o computador ou o smartphone para algum fim específico?

I1: Claro, com certeza. Nessas aulas de pauta, de fechamento de pauta, fechamento de script, fechamento de edição, ah, vamos lá, conferência de dados, vamos nos certificar das coisas, um repórter veio com tais e tais coisas da rua, ok, conversa com ele, mas na dúvida não precisa voltar lá, vamos checar por aqui. Assim, várias coisas dá pra gente resolver ali. Eu incentivei muitas vezes, mas como eu te disse, acho que tudo vai da disciplina da pessoa de entender o momento e se propor a desenvolver a atividade, né, a final, se ele se matriculou, poxa, ele tá indo no curso, ele tem que se sujeitar a algumas coisas.

P: Aham, entendi. Então assim, numa situação ideal, num mundo encantado. Como que tu acha assim que esses dispositivos podem contribuir positivamente pro teu trabalho como professora? Tu acabou falando disso ao longo da conversa, mas de repente se tu pudesse resumir?

I1: De várias, inúmeras formas eles contribuem. Pra quem trabalha com comunicação, principalmente a questão da checagem de dados, a questão do acesso às fontes, do acesso aos dados por várias fontes também, isso é um grande ganho. E a possibilidade também de esses alunos desenvolverem a linguagem a partir da utilização desses dispositivos, você tá editando uma matéria, você tá trabalhando com efeitos ali, trabalhando com os recursos que você precisa pra finalizar um vídeo, é óbvio que você precisa usar a ferramenta, né. Você não pode sair da universidade sem aprender a usar coisas que você vai usar na vida profissional. Então, foto, vídeo, tudo, é interessante e é fundamental. Então esses dispositivos são fundamentais. Mas eu acho que no processo de formação dessas pessoas, não adianta essa compulsão somente pelos dispositivos, o que muitos têm.

P: E tu consegue imaginar algumas razões pra essa compulsão? Pensando no momento da sala de aula, por que tu acha que as pessoas usam tanto isso?

I1: Eu acho que as pessoas hoje, não só em termos de comunicação, de acesso ao mundo assim, as pessoas estão numa corrida feroz assim, voraz, por consumir. É tanta possibilidade, depois da revolução industrial, a população, e olha não faz muito tempo, relativamente, porque olha o tempo que tem a humanidade, eu acho que depois disso as pessoas começaram a ter tanta tanta tanta opção, que elas não querem perder o bonde da vida, tem que sentar na janela, e tem que botar o corpo pra fora, e tem que sair gritando, porque se não vão perder algum detalhe. E isso me irrita porque ao mesmo tempo, é o surfista e o mergulhador, tu tem muito surfe mas tu não tem um

mergulho, entendeu. E isso é pra tudo, acho que as pessoas consomem os relacionamentos, consomem a ideia de uma vida ideal, um relacionamento ideal, de tudo que seja ideal, porque elas olham muitas imagens, elas têm muitas muitas muitas informações, e elas acham que vai acontecer aquilo só porque elas olham praquilo. Porque elas leem, ficam sabendo, mas elas não trazem pra elas aquelas melhorias ou aquelas informações, não colocam em prática muitas vezes. Mil dietas, mil receitas de não sei o que, mil maneiras de trabalhar com não sei o que, e a pessoa incorpora o que efetivamente? Então gasta 90% do tempo dela tendo acesso à informação, mas não processando as informações.

P: Então tu acha que é mais ligado a isso, a essa tempestade de estímulo, digamos assim. Entra-se num ritmo frenético de consumo e não se sabe a hora de parar.

I1: É, eu acho que é isso. Ah, fulano é um drogado. Mas só um pouquinho, quantos tipos de drogas hoje em dia, psicológicas, emocionais, não só as químicas.

Interview 2

P: I'd like to know first of all, for how many years have you been teaching now?
I2: For almost 5 years now. But I had a break, because my child was born. So for 1 year I had a break, so it interrupted also concerning the teaching. I started with the lectures in the master course, so it was not so interactive, like it is now when I have the seminar courses, it's much more interactive and you can give tasks to the students and let them work on it.

P: I guess you also have more freedom to create and bring more proposals. And your academic background is communication studies?
I2: Yes, media studies.

P: And you have been teaching only for TU Ilmenau, or?
I2: Yes.

P: Ok, good. Currently, how many hours a week do you have in class?
I2: More or less 2 hours a week.

P: And how many students more or less do you have?
I2: About 20.

P: Kind of personal question now. Did you aim teaching or it kind of happened?
I2: Oh, I need to remember now.
P: (laughs) How I ended up here? (laughs)
I2: I was curious about teaching, but it was not my intention to bring it professionally. Actually when I started teaching at the university I had those lectures and it meant for me a lot of preparation, because I started for the master, and when I started 5 years ago lots of master students were about my age as well, so to teach in front of them, it was Media and Communication Economy, it was a course that was about general topics, and I was felt that I needed to be and expert on that field, and show this of course as well, and I felt the students wanted to know a lot, so I prepared a lot each week, and it was a bit exhausting. It was like being thrown in deep cold water at the beginning.
P: Very challenging.
I2: Yes, at the beginning I felt that teaching is much more difficult than I thought it would be. Especially if teaching is a tiny part of your job, because you need to do the research as well, as those general topics, infrastructuring tasks and other stuff, it was a bit difficult. Teaching is really only a very small part of the job. It's probably different when you ask professor, because they have more lectures. But for the employees, those that are also doing that PhD thesis, teaching is something, this is my impression, is rather something aside, that you need to do but you can't really concentrate on it.

P: And evaluating right now your motivation to teach, are you really in this? Do you want to continue your career in teaching?
I2: Yes, sometimes I'm thinking about this. Because I know after my time at university I won't have to do another job, I want to stay at university. And I always thought if I would continue teaching, maybe not at university, but maybe for adults, maybe for children, I don't know. But I don't have actual background on this. But yes, hm, I'm not sure about this. I think I would like to teach if I had much more time to prepare for it. So if you have a job where you do only teaching

and you can really prepare for it, prepare tasks to integrate students much better, I would love to do it.

P: Alright, but right now you think it is rather challenging doing research and teaching.

I2: I like it when it is within my topic. Because I have a topic which I'm doing research on, it is crowdsourcing and creativity, and when I have the possibility to do a course on that topic I'm much more motivated. Then I wouldn't have to do like I did at the beginning, that Media and Communication Economy, which was very general.

P: So it is very time consuming to prepare everything.

P: Let me switch a little bit the conversation to your personal media use habits. Which media devices do you usually use on a daily basis? More laptop, smartphone?

I2: I have my laptop for professional and private use, so to write letters, when I need to write official letters, something like this, also when I do some private stuff. I also have a private laptop.

P: So they are two separate devices?

I2: Yes, I use that professional laptop also for private stuff. But last year I had the experience that my laptop broke down. I had no possibility to continue working and I had to get a laptop from the institute, so you can go down and borrow another one. I bought a private one for that case, and I also use it seldom. And I have a tablet, which I use for internet surfing and my mobile device also for surfing on the internet.

P: Alright, so you seem to be a very connected person.

I2: Hm, I would not say, not really. Yes, I am connected, I need to have the internet, just in case, I'm lost in the highway or something, or when I go also shopping I take it to compare prices for instance. But I do not feel that urgency to be always online and everyone can reach me. So you see, I have no mobile device here now. So if someone calls me, maybe from the kinder garden, I'll need to call back. I think that will work. And I don't se my mobile device for professional emails, just in case I'm on a conference, I use it but I'm login in on that web platform, so I'm not using that automatic email access.

P: So the messages are not coming all the time.

I2: Right.

P: Can you think of some moments of the day or some situations on your regular daily routine when you multitask with media somehow? For example, for eating, you are having lunch in front of your computer, I don't know, watching something or answering your emails. Is there something like that? Does it come to your mind some situation like this?

I2: Yes, of course. When I'm here at university I don't always go to lunch with my colleagues, because sometimes it is a bit, I don't know, stressful, so I sometime prefer to have a small lunch and maybe I'm, I'm often reading through magazine articles online, but seldom I work, I have the break then. Except I have no time here in Ilmenau, I have lots to do so of course I'm also working when eating.

P: And for example, when you are working on your laptop, reading, doing your research, are you usually connected to some instant message program?

I2: I'm always connected to Skype and sometimes also use it to communicate with colleagues, although there is only one colleague online, who is my colleague, my roommate, so to say, and the others I communicate via email.
P: So it may happen also this situation of multitasking when you are working and switch to another task.

P: Good, so now I would like to go to the real topic. Do you ever perceive your students in class consuming media through their devices in our class, on their laptops, on their smartphones, situations like these, do you perceive this in your classes?
I2: Yes, I have. But each is different. You have different courses, sometimes you have courses where almost it not really happens, sometimes I have students that are all connected on their laptops all the time, so I just think ok, they might be multitasking, as long as they follow and they fulfill the task, it is ok for me.
P: So the main device you perceive in class is the laptop?
I2: Laptop, yes. I'm not sure, I haven't paid attention if students are online or using their mobile devices. I don't know, maybe just when I'm telling or talking I'm not really paying attention to this. Can be.
P: Yes, maybe it is more discrete.
I2: My impression is, I rather see them with laptops than mobile devices.
P: And you said it depends. Some classes there are, some classes not. Have you ever thought maybe associated with something, like what kind of classes, like if there is a lecture, when you are just exposing the topic, is it more probable that they are going to have the laptop? And if it is a seminar not?
I2: If there are more people like having the lectures, like about 80 people, you will see much more people with laptops, much more people who are not really paying attention but doing their own stuff like that. I assume that when it is a smaller class, like 20 people, and it is more interactive, and people feel that I could ask them a question, they pay more attention and use the laptop rarely.
P: So it really depends. It would be difficult for you to say how often you perceive this. It really depends or could you say it's a rather common thing?
I2: That people use laptops?
P: Yes, in class.
I2: In seminars not so often I would say. Rather in lectures.
P: So you can see this difference.
I2: Yes. And I must say I'm not, how do you say, I'm not going there and checking if the person is just writing ahead what I'm telling or if that person is writing emails. I'm not checking this. I could do it. Maybe I should do it. (laughs) I never really thought about it.
P: It's interesting because reading the papers, there are some instructors that really do this. They go around the class, just stroll around just to check somehow.
I2: I would not really. Because the people, especially in the master course, they are all adults and if as soon as they know their multitasking works and that they can still pay attention to the class, it's for me ok. I mean I'm doing this also, when I'm in a meeting and have my mobile device with me and I need to, I can use that platform to check emails, And I know if the conference started at 9 o'clock or a meeting at university and I have not checked my emails yet or I need to write something urgently than I do it as well, because I know I can pay attention. But this is something that I think you will feel after some hours together with the students if someone is really paying attention and taking part.

P: Like you can tell by the behavior of the student in class.
I2: Yes.

P: Alright. In these 5 years that you have been teaching, because it's normal to hear this and I guess we can realize that this media multitasking is a trend. Like it is developing very quickly and people have more and more access to devices like this. Can you maybe see this growing trend if you compare the first year you taught and now? Can you say, yes, really, back then, 5 years ago it was not so popular, and now yes, I see people with more media in class. Can you realize this or you wouldn't say?
I2: It's difficult because at the beginning I had lectures and of course there were more people using media. As I said, it was more one directional, so they felt they could do something maybe private even. And now I have seminars, so it is difficult to compare this. But I think media usage behavior has changed and I see that students are much more online, I mean connected via Facebook, and I see they are posting. And some projects we are doing for students, like Berlin excursion, for the bachelor course where they go to Berlin and meet some media companies, that communication is taking place a lot on Facebook, for instance, and that was not some years before, we had that classic email communication. But in the courses is not that extreme. Although I see that some years before when I had an interactive task, I had the feeling I needed to tell the students to bring laptops with them and now when I say come together in groups and work on a task, I can be sure that at least one of them has a mobile device to go online and check out some data and do some research.

P: This is interesting. So if you are thinking on the idea, on the proposal of your classes, what you want your students to develop, the topics you teach, the topics you work, the use of media, the presence of media devices in class, do you think they are mostly positive or mostly negative? Let's think in these 2 ways: for the learning of the student, ok, the outcome they can have from your proposal, and also for your work as an instructor.
I2: I think I would make a difference as well, between lectures and seminars. I think or I assume that for lectures it would be more negative. Because I have the feeling, and I must confess it is for my time as student we were already having mobile devices, laptops, and we had the wireless network to go online. It could be more negative, because when someone is talking in one directional way and talking about stuff, you only need 5 minutes to do something private to really lose the frame of what the person is talking about. And that might be difficult for courses, because I have not experienced that people are using to be distracted, to do something private, I think it is rather positive, as I said, and do also spontaneous tasks and say ok, let's split up in two groups and you work on a certain task, that could work. Because when I remember my time as a student, we also had those tasks, we were instructed to come together as pairs, or groups of people to, I remember, to invent a TV format, for example. And then it was always necessary that one had his laptop with him or we needed to go to a room where there were computers to check on that. And today this is much easier. So you can improvise maybe a bit more. And the people can really check on data. And maybe they can, I don't know if it really happens, but I would do that as a student, if I don't understand something, it can be a word, you can look it up and so you can get back

to the context and understand it much easier and you don't disturb the process. But you know for this it is difficult because I'm not checking what people are doing.

P: So you would say it's quite difficult or maybe we can go back to this differentiation between the lecture and the seminar, you cannot really tell when you see your students with the laptop if they are mostly distracted or they are mostly in line with the activities you are conducting? Do you think it's hard to tell or can you somehow distinguish?
I2: I think if you see a student that uses a laptop or mobile just punctually, just sometimes, and then is following you again, is looking at you and you can see the person is listening, this is a sign that the person is really involved. Maybe has just written an email, which is ok for me, or maybe has even checked something, or looked something up on the internet to understand better. But if there are people that are continuously on their laptops, I assume they are not really writing a protocol about my lecture of course, I think they are all distracted and sometimes maybe only because the weather is bad, just being in the warmth of the lecture room and having access to the internet, but in the end is always a problem of the one that is teaching, if you cannot really make the people be involved and listen to you, it's your problem then. And you should not feel distracted by those, by only some people who are maybe sitting maybe in the last row and checking emails. You need to work then with those that are present and want to learn and ask questions.
P: Alright. So basically this is your, let's say, policy. You teach for the ones who are with you.
I2: Right.

P: So maybe when you are in class and then you are beginning your activities and you see like some of your students opening the laptop. Does it bring some effect to you? Somehow do you think like "bleh" or for you is something really normal?
I2: Yes, there is of course. Maybe at the beginning there is a moment when I think what are they doing. But I then need to not think about it anymore, because if I would think about it, I would be distracted, because when I'm thinking about all the things that are happening around me, of course you need to think about the people that look at you, is it good feedback or bad feedback, if someone is looking at you like this (puzzling face), I'm always thinking what did I tell, what could be the problem now. But if I am doing this too often thinking about those ones who open their laptops I would be distracted myself. So yes, maybe it's part of my philosophy that I'm ok, it could be that this person is doing something private, it could be also that this person is just following my course with checking some issues on Wikipedia or whatever. Can also be. But my philosophy is if the person was not interested, he or she would not be here and if there are other things that matter, that are urgent because the person is writing a thesis and need to have some contact with whoever, and then it's urgent to be sent, it's also ok for me, because my philosophy is not that people have to pay attention all the time. And sometimes it's even, for me, my impression is that people who have their laptops with them, they sometimes feel in a way that probably, I don't know, it's a feeling, the need to ask a question or they urgently all of a sudden feel the need to show that they are still there and they listen and they work on the topic, too. And those who are not involved are rather the people that have no laptop there, they look at me, but I don't know, they are somewhere else. And this is my impression.

P: You mentioned that sometimes you request your students to, not request, but maybe suggest your students to use the laptop in class, right?
I2: Yes, sometimes.
P: Mainly to accomplish a task or to search for something?
I2: Mainly to do research. If they do something creative or they have to work out something or maybe when I'm doing a course on the topic of crowdsourcing I cannot say that everyone is really on that field and everyone knows what crowdsourcing is, of course I assume, or I wish, I just think that the student when they come to my course, they have somehow before they started the course looked it up on the internet and got a feeling for this, this is also what I expect for the master students but I cannot expect that they are really into that and know what the platforms are all about and know what platform I'm talking about and know what platform I'm talking about like Atizzo, like they know what it is. So I think when they work on a creative task for instance, it is better for them to have a laptop.

P: And when the students appear with the laptop in your class, can you imagine what could be the reason for this need that many young people have to be with the laptops all the time? Like what would you imagine as the main reasons why they bring their laptops to class?
I2: I could imagine, there may be several reasons. I could imagine that some students have their laptops in class just because they are coming to the campus and have some breaks here as well and they need to have the laptop also in between courses, in the breaks, so I think when you have your laptop with you, you might feel also the need to use it then. And maybe even to have that need to do more multitasking to use your time efficiently, which could be a harm, because it is some sort of distraction and there are some studies that say that multitasking is not good, but of course it is something that has evolved with social media, that you think you must be online and check things, yeah, is just the need that has evolved, probably the students themselves don't really know why they are having their laptops with them, why they are opening them, maybe it is also mechanically, automatically, that you have your laptop and you open it.
P: It's like part of their life.
I2: Right. I would say.

P: Alright. If we needed like, to summarize now: the presence of laptops in your classes, you would say it is more tending to be a tool that helps your job, that helps your classes or tending more to be a source of distraction? Like the good guy or the bad guy?
I2: I cannot say generally. In the end it's not distracting me, because distraction would mean that there are no people at all who work with me. As soon as I have from 20 people, those 5 up to 10 people that work with me, it would be no distraction, even if there are people in class that use their laptops for private usage. It's a matter of the students if it's distracting them or not. And yes, I think some might be distracted and next time have no idea what I was talking about, there might be even people who have no idea what I was talking about and had no laptops with them. And others might have, because they can check things, look things up. Maybe give also them the feeling that they won't miss something urgent occurring outside. So for me it's no distraction.

P: So in an ideal situation, laptops can really contribute to the classes in the way you teach.

I2: Yes, it can be helpful and I think it will be much more important a few times, as I said that point when the students have the possibility to look things up. I myself see this when I'm sitting in a seminar and there are students. For instance we have that regular seminar where students present their topics for their bachelor thesis and sometimes I'm not also into that topic because it's something that I don't have a clue of, then I also want to have my mobile device and I google stuff, and it might appear to that student in front of there, that I'm not interested or I'm checking emails or whatever or surfing through prospects. But it's not the point, because on that moment I'm really, I'm still involved. It's a mater of trust that you have then, to trust the students that they are involved and when do they something on their laptops, on the mobile devices, it still had to do with the topic, it still has to do with the course. But it's what you call philosophy of the teacher. Is it important for you that everyone is really following , everyone is listening to you? Or do you treat the students as adults, if you want to participate you can, and if you do not feel like participating, it's ok, because every day is not the same, I see this in myself, that sometimes I have a good day and I can follow all the time and be integrated and sometimes I know I need to be there or I have gone there but I can't really concentrate. It's a matter of trust and what you feel it's important for you and your course.

P: Just a last question: can you imagine a situation, like what needed to happen for you to take and attitude like asking students to switch off their devices?

I2: Maybe if it is a noise distraction. If someone is calling again and again or you know that noise when your mobile device is, I don't know, the signals disturbed by networks, wireless networks and makes that strange noise. Sometimes that happens again and again if a mobile is switched on, but something like this has never appeared in my courses. I could imagine that I would then say please switch off.

P: Alright, if it becomes a sound disturbance.

I2: Right. Or if the person would really do a phone call. But I think none of my students would have done this. I can't remember or I didn't really pay attention.

P: Yes, I guess nowadays people are much more used to this netiquette thing. So, from my side it would be those questions. It was very nice, it will be a very nice material for me to analyze. Thank you very much for your time.

I2: You're welcome.

Interview 3

P: Faz quanto tempo já que tu tá lecionando?
I3: Ihhh! (risos) Eu dou aula desde 1973, na verdade eu dou aula desde quando eu estava fazendo a faculdade, me formei em 1980, então, acredito que eu entrei 1976, olha talvez podemos colocar como início 1978, mesmo assim dando aula particular, dando aula em colégios de ensino médio, então eu sempre mantive a minha atividade de faculdade dando aula. Depois, eu me formei em 1980, a partir de 80 nunca mais parei. E no ensino superior , eu entrei na verdade em 1982 como professora substituta, aí fiquei um ano de substituta na universidade, daí depois fiz concurso e entrei mesmo pro quadro permanente em 1983. E desde aí, então, eu estou sempre dando aula.

P: Que coisa boa, e parece ser bem apaixonada pela docência.
I3: E apesar do tempo assim, sempre procurando, e aí já entra um pouco dentro do teu trabalho, sempre procurando exercer a minha atividade me adequando ao momento em que se está vivendo, principalmente a questão tecnológica. Então eu acho que isso assim é um necessidade, eu acho que a falta de modernização das ferramentas de ensino acaba distanciando o aluno do professor, e distanciando sobretudo o aluno do conteúdo da disciplina. Acho que cria uma barreira no sentido de que parece que eu tô ensinando pruma época que não é a minha né. Então o aluno percebe esses momentos, esses tempos diferentes, né. E eu acho que o professor não pode estar num tempo diferente do aluno. Então a gente tem que correr atrás.

P: Certamente. Mas nem todo mundo pensa assim. Porque muitas pessoas pensam o contrário, que o aluno deve se adequar ao estilo do professor. Mas é interessante que tu tenha esse posicionamento.
I3: Mas eu acho que isso é até uma questão de personalidade, é a própria inquietação que eu tenho como pessoa. Então na verdade eu como pessoa tenho uma inquietação e sou bastante crítica assim com aquele professor que leva aquela folhinha surrada, a gente já foi aluno e a gente sabe, os alunos se reúnem e começam a criticar, dar risada, a fazer piada, né, e o professor que tá ali naquele livro que entra semestre, sai semestre é só aquilo, aquela folhinha amarela, né. Então eu tenho essa preocupação de poder me aproximar do meu aluno e que ele não me enxergue e pense "ai meu Deus, o que ela vai me dizer é coisa de ontem". Então eu preciso encontrar formas de prender a atenção dele e isso está em toda maneira em como eu me apresento, tanto na questão do cuidado visual, como pessoa, né, na questão das próprias ferramentas que eu vou usar na aula, eu acho que isso causa... ele vai prestar atenção em mim, e ele prestando atenção em mim, eu vou ter oportunidade de passar a minha mensagem. Então, eu penso que talvez seja assim. Eu acho que o fato de eu me preocupar está muito nessa minha visão de mundo, do exercício da profissão, da maneira que tu te relaciona com os outros, eu também tenho uma facilidade doméstica, que eu tenho 2 filhos formados em informática. Então assim eu fui meio um laboratório pra eles. Foi uma coisa bem interessante, porque assim, os guris vinham com as inovações, "vamos fazer isso" e as coisas fechavam, eu estava sempre disposta a fazer. Criamos um site, criamos um fórum, criamos uma metodologia, que essa metodologia que eu uso nas minhas aulas ganhou até um prêmio pela Copesul. Então na verdade isso também é uma coisa que facilita bastante.
P: Claro, é uma aproximação que tu tem naturalmente.
I3: É porque de repente tu pensa determinadas coisas e tu tem a facilidade de discutir com pessoas próximas, quer dizer, concretizar aquilo que tu tá pensando. Então acho que muitas vezes a dificuldade para concretizar, e eu via isso antes de os meus filhos

estarem fazendo o curso, que eu buscava por exemplo na universidade o CPD e as pessoas não tinham tempo, entendeu, porque as pessoas tinham outras coisas, elas tinham outras prioridades que não era atender uma professora, que queria fazer um site. Aí eu também não tinha condições de eu bancar financeiramente essa ideia, esse projeto. Então eu acredito que muitas vezes tenha esse tipo de dificuldade, que as pessoas acabam esbarrando, que é essa luta contra uma burocracia, uma dificuldade. Então todas essas coisas acho que facilitaram.

P: E assim, na tua vida pessoal, no teu dia-a-dia, tu usa esses dispositivos, como smartphone, laptop, tablet? Tu usa bastante além do profissional, na tua vida diária?
I3: Uso, sim. Sempre procuro me manter atualizada. Aquilo com que tu não tá familiarizada, tu tem dificuldade de usar, então eu procuro usar essas ferramentas todas, tanto na minha vida pessoal. E assim, como eu te falei, tem essa facilidade familiar, então acaba que isso é da nossa conversa, então eu tenho que daí acompanhar, assim como futebol, que eu tenho que também acompanhar, eu tenho que acompanhar também as inovações tecnológicas.

P: E durante o teu dia tu normalmente te pega fazendo outras tarefas combinadas com o uso destes dispositivos? Porque tu ter um tablet, um smartphone, tu leva eles pra qualquer lado. Tá no trânsito, tá num ônibus, tá viajando, tá comendo às vezes e tá ali na frente do computador, tá dando tua corridinha ou tua caminhada e tá escutando música e lendo teus e-mails. Tu reconhece isso de estar fazendo diferentes tarefas ao mesmo tempo que está lidando com esses dispositivos?
I3: Com certeza. A gente tá sempre preocupado querendo saber, essa questão da ampliação do nosso universo de contatos e de informação, isso aumentou muito com o acesso a essas tecnologias. Então eu percebo hoje que eu tenho uma necessidade, é uma coisa assim orgânica, passou a ser orgânica, que tu vai trabalhar no computador e vai lincar todos as tuas tarefas e contatos, de repente um te chama, qualquer um te encontra no celular, tem também as redes sociais. Mas eu procuro colocar também algumas limitações, eu procuro ter alguns momentos que eu fique mais alheia a isso pra privilegiar o contato com as pessoas fisicamente e não apenas virtualmente. Mas a gente está sempre atento a essas coisas, tu tá assistindo a alguma coisa, tu tá com o celular ali, tu põe no silencioso, mas tu tá atento com alguma coisa que chegou, alguma mensagem. Então eu acho que isso aí hoje passou a ser algo comum na vida das pessoas e é uma necessidade que acabou se criando e que a gente não tem muito como evitar. Tu pode limitar, disciplinar, alguma coisa assim.

P: Marta, atualmente mais ou menos quantos alunos tu tem em aula?
I3: Nossa, tenho bastante, porque aumentou muito as turmas. Deixa eu fazer uma conta. Esse semestre, por exemplo, vou ter 4 turmas de Toxicologia, em média 20 cada uma, são 80. Olha, eu tenho tido assim, por semestre, de 100 a 120 alunos.
P: E por turma são mais ou menos em torno de 20 – 30?
I3: De 20 a 30 é a média das turmas.
P: E é mais aula para a pós-graduação ou para a graduação?
I3: Mais aula para a graduação. E são os cursos de Química. E assim ó, dentro da maneira como eu estruturei a minha metodologia de aula, porque como eu trabalho a questão do meio ambiente, uma das preocupações que eu sempre tive é com relação com o gasto excessivo de material, principalmente em termos de aula, papel, xerox, essa coisarada toda. Então organizar o ambiente virtual pra hospedar todas as informações veio ao encontro dessa preocupação. E eu percebi que à medida que a

tecnologia ia entrando na minha aula e nas minhas disciplinas, isso facilitou muito a aproximação dos conteúdos dentro dum contexto global, quer dizer, a disciplina, daí eu procuro mostrar e fazer com que os alunos percebam que o conteúdo das disciplinas não está desconectado do mundo que eles vivem. Esse uso dessa forma de ensinar mostra que os conteúdos não são só conteúdos de livros, aquele ensino livresco, tu busca contextualizar com as coisas que estão acontecendo ao teu redor, então isso para o aluno, diminui o distanciamento da informação do conteúdo com o contexto da vida dele. Então isso é uma coisa que eu vi que se tornou muito mais dinâmico, muito mais interessante o aprendizado dessa forma. Então assim, dentro das minha disciplinas eu tenho um site, onde nesse site eles têm todo o conteúdo ali, conteúdos, apostilas, inclusive provas, trabalhos avaliativos, a gente faz tudo online. A gente não usa papel e todas as ações são absolutamente interativas. Então a gente usa Skype, quando tinha MSN a gente usava MSN, a gente tá sempre usando essas ferramentas pra se comunicar, ampliando a possibilidade até das relações assim né, não ficam limitadas àquele dia que a gente em aula. Hoje com Facebook, eu uso muito Facebook com eles. Então assim, todas essas mídias passaram a fazer parte do ensino. Junto com isso eu tenho um fórum de discussão, então nesse fórum de discussão os alunos tem que postar notícias, conteúdos relacionados com aquilo que a gente discutiu na aula. Aí na aula seguinte eu chamo alguns "ah, tu postou tal coisa, comenta, vamos discutir". Então assim ó, tu faz também o aluno se familiarizar com essas ferramentas, porque uma coisa que eu observei assim ó, a UFSM é uma universidade onde a grande maioria dos aluno vem do interior do interior. Então muitos deles não sabem nem ter uma postura em relacionamento dentro dum ambiente virtual, porque a impressão que dá é como um ambiente virtual tu não tá tocando tu pode te comportar de qualquer jeito, ninguém tá te... tu não tá sendo censurado, tu não tá sendo observado, e não é assim. Quer dizer, o ambiente virtual ele realmente pode se prestar pra um relacionamento profissional extremamente sério, responsável, e a gente tem que fazer o uso disso e saber fazer esse uso. Então a questão de usar um email, de saber fazer uma pesquisa, de procurar, de ter cuidado em relação à propriedade de uma imagem, à propriedade de uma informação, não é porque uma informação é aberta que eu posso me apropriar disso da maneira que eu quiser. Então sabe assim ó, eu observo que o uso dessas tecnologias proporciona uma série de conhecimentos que vão muitíssimo além do conteúdo do programa de uma disciplina, do programa de um curso, então eu acredito que haja uma complementação na formação incrível. E eu vejo que os alunos vão fazer essas provas que tem de avaliação de final de curso e toda essa cultura que é passada desde o primeiro semestre, porque eu dou aula pra aluno de primeiro semestre, deles buscarem assim sempre estar sintonizados com as coisas que estão acontecendo, leva eles muitas vezes a "ah, professora, lembrei da senhora nisso aqui". Então eu percebo que o uso das tecnologias realmente aproxima muito não só as pessoas, no caso aluno – professor, se souber usar, porque não é uma técnica de aula. Eu sempre fico muito quando dizem a gente larga os conteúdos, não é um ensino à distância, de maneira alguma, ao contrário, a proposta é o que, que essas ferramentas sejam mais uma maneira de aproximar, de ampliar nosso contato, nossa possibilidade de interação. Eu tô trabalhando, eu tô fazendo uma apostila, um material, eu to com o email aberto, eu to com o Facebook aberto, a hora que o aluno vê uma coisa ele me chama, ele sabe que eu to ali, ele me chama, eu respondo, a gente já discute. Então eu acho que essas coisas elas são assim pra mim muito importante e ampliam a possibilidade de agregar conhecimentos e ampliar o universo de observação até das oportunidades que estão aí, né.

P: Durante o tempo em aula vocês também fazem uso dessas ferramentas, dos fóruns, do site,..?

I3: Fazemos, porque assim ó, eu fiz um projeto que a gente desenvolveu mídias eletrônicas pro ensino de química. A gente tem uma série que se chama A Viagem de Kemi. Tem até, eu fiz uma página no Facebook da Viagem de Kemi. A Viagem de Kemi é uma série que a gente fez de vídeos, jogos eletrônicos e áudios. Então é um conjunto de 306 mídias pra o ensino médio. Então é uma ferramenta tanto pro professor, na hora que ele vai desenvolver um conteúdo, quanto pro aluno ter uma linguagem mais lúdica da questão da química. Então assim ó, a hora que tu olhar tu vai ver, são episódios curtos, 8 a 10 minutos. Eles têm uma preocupação assim de uma linguagem teatral, foi feito numa produtora de cinema, então tem uma qualidade profissional no material, não é uma coisa amadora. E aí no desenvolvimento desse projeto, ele foi financiado pelo MEC, e nesse financiamento houve a compra de equipamentos, computadores e tal. Então a gente montou uma sala, a gente tem uma sala equipada. E essa sala, mesmo finalizado o projeto, hoje eu utilizo como suporte para as minhas aulas. Então os alunos têm lá o espaço pra ir acessar a internet, pra acessar o site, pra acessar o fórum, pra postar notícia, pra fazer pesquisa, pra fazer os trabalhos avaliativos que a gente faz. Então eu uso sim durante a aula, eu tenho as minhas aulas presenciais, no caso dessas disciplinas que eu vou dar neste semestre, essas turmas dos calouros são só 2 horas por semana, então é um espaço muito pequeno e eu tenho que aproveitar, então eu coloco horários fora da sala de aula pro aluno que quiser, vai lá, sempre tem alunos que se dispõem a trabalhar junto, tipo monitores. Então realmente eu uso sim esses equipamentos sempre junto com o conteúdo e com as minhas aulas.

P: Eu fico curiosa assim, nessas aulas presenciais, que tu traz as tuas propostas de atividades pra eles, que muitas vezes, como tu falou, envolvem essas mídias e tudo. Eu imagino que a maioria ou boa parte dos teus alunos, me confirma isso ou não, eles têm os próprios dispositivos deles, então imagino que eles venham pra aula com os laptops, com os smartphones, com um tablet, por exemplo. E eu fico curiosa em saber se essa tua proposta envolve eles na tua aula, tu acha que mesmo quando eles estão no próprio laptop, no próprio tablet, tu vê eles engajados na tua proposta ou tu acha que eles se dispersam de alguma forma por estarem no seu próprio tablet?

I3: Eu acho que assim ó, um pouco dispersa, porque assim ó, é óbvio, principalmente a questão das redes sociais, é uma coisa que eles estão, a gente mesmo, imagino eles que, esses meus alunos, por exemplo os calouros, eu vejo que assim, quanto mais jovens, maior a dispersão. Quanto mais no início do curso, maior a dispersão. Porque eles tão assim, tudo é novo, eles têm, a maioria, 16, 17 anos. Então eles são muito jovens, com pouca maturidade pra realmente aproveitar tudo aquilo que eles tão tendo. Então às vezes eu até me irrito, sabe, às vezes bah me irrito, brigo com eles, chamo a atenção, fico cuidando, porque assim ó, há um esforço, há um esforço pessoal bastante intenso. Olha, às vezes eu fico até pensando assim, a minha filha que ri e diz assim "ai, mãe, tu arruma sarna pra te coçar e depois tu fica só reclamando". Porque assim ó, todo esse uso dessas ferramentas, o fazer eles usarem os ambientes virtuais, eu preciso também tá compartilhando isso com eles. Então é óbvio que a minha aula não se limita àquelas 2 horas de aula que eu tive com eles durante a semana, eu passo a semana inteira envolvida. Eu tenho que ler notícia, eu tenho que saber assim quando eles me dizem assim "ai professora, tu viu a notícia que eu postei", super entusiasmado, como que eu vou dizer pra ele "não, eu não vi" ou fazer

uma enrolação, eu preciso mostrar pra ele que eu vi, eu preciso motivar ele com aquilo, com a atitude dele. Então assim ó, isso acaba me dando. Aí tu pensa assim, são mais de 100 alunos, quer dizer, eu preciso estar atenta a todo eles, então assim, mas voltando ao que tu me falou, se há uma dispersão, acho que há uma dispersão, mas eu procuro tá atenta, eu procuro fazer tornar interessante, uma coisa que assim eu consegui muito diminuir um pouco essa dispersão e talvez até o desinteresse, é valorizando em termos de nota todas as atitudes deles positivas. Por exemplo, eu chamo em sala de aula "Fulano, tu postou uma notícia sobre isso, comenta conosco", aí ele fica assim, ele não sabe, ele fez só um copie e cole ali. Então aquilo ali já não me serviu de nada, aquele aluno, então isso tá levando, eu sempre mexo com eles, eu uso assim essa, nós nos achamos muito, nós já estamos muito civilizados, porém nós ainda temos posturas quase parecidas quando os explorados portugueses chegaram no Brasil, como que eles conseguiam levar as riquezas do Brasil, eles trocavam aquilo que eles queriam com os índios por espelhos. Então eles davam uma coisa que os índios gostavam, que era aquela curiosidade por espelhos, e enchiam os navios de pau brasil. Então eu uso a mesma técnica, o que que os alunos tão preocupados, com a nota, eles querem passar. E eu tenho que achar alguma ferramenta, eu tenho que usar isso, esse desejo deles de passar, pra o que eu quero, que é o que, que eles procurem, que eles sejam curiosos, instigar a curiosidade deles, o interesse deles, que eles se envolvam na disciplina, em troca do que, 1 ponto, 2 pontos. Então assim, não era o que eu queria, a proposta não era essa, a proposta no início era uma coisa voluntária, eu achei que quando o aluno chegasse na aula e visse a possibilidade de ele ter uma disciplina que ele podia acessar a internet, que ele podia acessar um tablet, que ele podia usar o notebook dele, que ele podia usar o smartphone, eu achei que ele ia achar o máximo aquilo, mas não é bem assim.. Então eu encontrei algumas formas, entendeu, e a forma, e vi que isso aí funciona. Então assim, eu dou uma pontuação pela participação no fórum, pela participação, eu chamo o momento do fórum, que é o espaço em aula onde a gente vai discutir aquilo que foi postado, então agora parou o conteúdo, vamos para o momento do fórum. Então eu vejo que muitos hoje já levam a sua notícia, já estão preparados, então eu percebo assim ó, que à medida que eles vão avançando no curso nossa, o interesse tem sido pra mim, altamente gratificante. Os alunos que chegam na disciplinas Gerenciamento de Resíduo, a parte de tecnologia, eles já perceberam que essa forma de aprender ela atualiza os conteúdos, e eles passam a ter interesse de estar na mensagem e enriquecer, eles passam aí a também ser parte da disciplina, e não só eu, não só aquela doação de um lado e tu não recebe, Eu acho que a dispersão tá relacionada à imaturidade, e também à falta de familiaridade, porque assim, eu percebo, e não to falando isso assim como uma coisa pra engrandecer, eu acho que eu sou a única pessoa que faço isso, pelo menos dos meus colegas. Hoje tão usando muito Moodle, alguns já tão usando isso, mas também é outra plataforma, é outra proposta.

P: E é mais pra ensino à distância mesmo, né, é outra proposta.

I3: Exatamente. Então eu vejo assim, o aluno não tá familiarizado, ele vem com um ensino médio altamente livresco, onde o professor enche o quadro de giz, onde ele tem que fazer um monte de exercício, coisas completamente inanimadas, então esse dinamismo assim eles não estão... Então acho que isso tudo pra essa, não saber aproveitar bem o potencial. Mas é uma questão de água mole em pedra dura, tanto bate até que fura. E eu acho que hoje assim eu tenho muito orgulho dessa forma, porque assim ó, eu tenho certeza que ela tá contribuindo com a formação dos alunos. E auxiliando não só na minha disciplina, mas de uma maneira geral, e ter uma visão até deles como professores, porque eu dou aula pra Química Licenciatura. Então até

pra fazer esses novos profissionais terem uma visão diferente do próprio exercício deles e não ficar escravos daquela metodologia tradicional.

P: Muito interessante isso. Deve ser um laboratório muito importante pra eles. Eu fiquei curiosa na parte que tu comentou que às vezes tu te irrita, quais situações que te causam isso, quando tu os vê fazendo uma coisa nada a ver, assim, tipo no Facebook ou sei lá?

I3: Isso, nada a ver, por exemplo, não se envolvendo, então por exemplo aquela coisa de cumprir de qualquer jeito, então assim, nem sabe o que tá fazendo, pega uma informação desatualizada, não tem senso crítico pra avaliar se aquilo realmente contribui pra alguma coisa, então vou te dar um exemplo assim bem simples: eu tenho uma disciplina é Gerenciamento de Resíduos, e dentro do gerenciamento de resíduos tu tem legislações que elas são, elas mudam, elas são atualizadas muito seguidamente. E na internet, por exemplo, tu tem muita informação de trabalhos que foram desenvolvidos anteriores a uma dessas atualizações. Aí o que que acontece, o aluno me pega um trabalho, que não tira o valor do trabalho, porém ele tem que fazer uma atualização. Então por exemplo, tem uma norma técnica de classificação de resíduos, que hoje a que tá vigorando é de 2004, aí o aluno me apresenta a de 1987, que foi a anterior, quer dizer isso me irrita porque ele simplesmente assim a primeira coisa que ele encontrou foi o que ele escolheu. Então essa visão de realmente qualificar aquela informação, ter senso crítico, facilidade do acesso tem que levar a um desenvolvimento do senso crítico, nem tudo que está ali posto é uma verdade inquestionável, então essas são coisas que me irritam. É porque eu vejo que foi feito rapidamente, de qualquer jeito, sem dar a devida importância. E essa questão em aula, especificamente, a dispersão, a não participação, mesmo que eu dê alguma pontuação pela participação, o aluno que não participar, ele não vai ser reprovado, não é o suficiente para reprovar. Então quer dizer, se ele optar por não participar do fórum, por exemplo, em não participar dessas atividades e fizer as outras coisas, ele vai ter nota suficiente pra passar, inclusive sem exame, porém eu acho que isso é uma visão tão pequena do que ele tá querendo em termos de aprendizado, que isso me irrita. Com isso eu acabo fazendo aquele papel não só da professora, mas daquela pessoa que já tem uma trajetória grande, é mãe de 4 filhos adultos, já tive que orientar isso, e sei o diferencial que na formação profissional isso vai ter. Então na hora que ele fizer a opção por não participar, ele não tá tendo o prejuízo só na minha disciplina, ele tá tendo prejuízo na vida dele, na formação dele, de ser uma pessoa com mais curiosidade, uma pessoa mais crítica, uma pessoa que vai ter condições de ver várias formas de conhecimento, ter preocupação com a atualização das coisas, ter que entrar em contato com uma linguagem dentro desse universo da comunicação eletrônica, outras línguas porque muitas vezes tu tem que entrar em algumas coisas do inglês e tal e eles se bloqueiam praquilo. Então assim ó, essas coisas eu acabo usando pra mostrar pra eles que não é só a nota. E aí eu uso de novo a figura do explorador e do índio, que parece uma coisa muito simplista, mas é o quanto eles tão tendo prejuízo nessa formação que depois assim ó, o próprio mundo profissional vai fazer uma seleção natural, a lei de Darwin é real. Não são só os mais fortes que sobrevivem, mas os mais preparados. E a preparação se faz desde o primeiro momento que eles entram na universidade, então eu fico muito chateada e me tira da paciência é essa visão completamente linear das coisas, sem abrir a cabeça, então esses aí eu vejo que eles vão chegar ao final do curso e vão dizer "Meu Deus, e agora o que eu faço" porque ele não foi uma pessoa que aproveitou quando ele foi instigado a ver que o mundo vai muito além da porteiras da Base Aérea. Não é a Base Aérea que limita o

nosso universo. A gente tem um mundão gigante pela frente e a gente pode se educar pra esse olhar e isso é uma coisa que também me tira da paciência, então eu uso isso, eu já fui coordenadora de curso, eu oriento estágio, eu dou aula na pós-graduação, eu vejo esses dilemas, e eu tento trazer isso e antecipar pra que eles não tenham esses sofrimentos. Mas alguns não captam a mensagem.
P: Mas com certeza pra alguns isso vai fazer a diferença.
I3: Sim, e isso gratifica bastante, eu vejo que sim.

P: Com certeza deve ser bastante gratificante. Só quero te fazer mais uma pergunta. Se tu tivesse que avaliar a presença dessas mídias todas na tua sala de aula, resumindo, tu já me disse muita coisa, já consegui ver bastante o teu posicionamento, mas se a gente pudesse resumir a tua opinião, o teu sentimento em relação a todas essas mídias presentes em sala de aula, tanto como ferramentas pra ti como professora, quanto ferramentas de aprendizado pros teus alunos, como que tu avalia em geral assim, mais com potencial pra ajudar, pra contribuir nesse processo de ensino-aprendizagem ou mais, como também uma coisa que de certa forma prejudica ou até mesmo ameaça pela questão da dispersão, enfim...?
I3: Não, não, eu acho assim, só o potencial é enorme, ele é altamente positivo, e quero poder acompanhar essa evolução pra cada vez mais intensificar, ter mais ideias pra usar esse potencial dessas ferramentas dentro da questão do ensino, que eu acho assim ó incrível. Eu vejo, eu me vejo, o meu exercício profissional perfeitamente delimitado antes disso e depois, por exemplo, eu vejo que eu como professora, eu cresci enormemente, eu ampliei a minha visão, eu me tornei uma pessoa, uma profissional, uma professora mais preocupada com o mundo fora que só aquele mundo pequeno de sala de aula, a questão de interação com outros conteúdos, com outras profissões, então assim acho que isso mostra, eu vejo que a química, como ela é tida como uma ciência exata, ela se fecha muito dentro da química, da física, da matemática, e olhe lá. Quer dizer, tu pensar química interagindo com artes cênicas, é coisa..
P: É uma fusão interessante.
I3: Gente, isso é um espetáculo. E a gente tá fazendo isso! Fazer química junto com o pessoal do design, quer dizer, então assim ó, eu vejo que essa possibilidade, o uso dessas ferramentas, te coloca como profissional dentro de outros universos que não é só o teu, e tu tem que aprender a linguagem, tu tem que aprender e te comunicar com as pessoas, tu tem que aprender a conhecer um pouco e também desenvolve o teu conhecimento, então assim, eu só vejo o lado positivo do uso dessas ferramentas. Fico muito frustrada quando vejo, por exemplo, o projeto da série A Viagem de Kemi, se tu tiver a oportunidade, e tô falando assim, não como a coordenadora e a pessoa que trabalhou nisso e é apaixonada pelo que fez, assim ó, tu vai ver a qualidade daquele material, e assim ó ele é subutilizado, as pessoas não sabem usar, sabe. Então eu vejo que ainda há um caminho muito grande pra explorar dentro do uso da tecnologia, dentro do uso tecnologias, equipamentos, plataformas, como dentro de uma metodologia de ensino-aprendizagem. E acho que o dia que isso for usado de uma forma mais intensa, a gente vai conseguir diluir, dissolver vários bloqueios que existem principalmente em relação às ciências exatas, desmistificar dificuldades, desmistificar o distanciamento das coisas. Eu acho que toda essa tecnologia proporciona isso. Então eu sou assim uma entusiasta do uso dessas mídias, acho que só tem benefício com relação a isso. Acho assim ó, não sou, acho que há, não vejo as mídias como substituinte de pessoas, de forma nenhuma. O papel do professor, o papel do aluno é extremamente importante, elas vem como, o nome tá dizendo, ferramenta. É algo pra auxiliar, aproximar, tornar mais dinâmico, mais crítico. Aí eu

sou assim, nossa, eu quero poder acompanhar. Eu acho que eu só vou desistir, só vou me aposentar quando eu disser "bom, agora eu já não to mais... vou trocar isso, o meu tablet, o meu iPad por uma agulha de tricô", mas por enquanto eu ainda acho que dá.
P: Claro que dá, pelo jeito tá fazendo um trabalho bem legal. Eu só tava tentando procurar aqui no Facebook, como se escreve "Kemi" tu falou?
I3: A Viagem de Kemi K-E-M-I.
P: Ah, ok. Ah, achei.
I3: A gente fez um canal no Youtube onde os vídeos estão ali. Olha, é muito bacana, muito bacana mesmo. Dá uma olhadinha tu vai achar bem legal.
P: Muito bom conversar contigo, me deu vários insights legais.
I3: Qualquer coisa que tu precisar ou quiser voltar a conversar, eu estou sempre à disposição.
P: Fico feliz em retomar contato contigo, eu lembro que era bem legal conversar contigo na época do Atitude Certa. Mas por hoje eu agradeço muito pelo teu tempo, foi muito bom mesmo, e desejo sucesso aí na tua jornada, nessa aventura que é dar aula, que é uma aventura pode se dizer.
I3: Mas é uma coisa, é super legal porque assim ó, cada semestre, pelo menos assim, da maneira como eu encaro, ele é um desafio e ele é diferente. Então eu necessito deste dinamismo. Então é por isso que eu preciso dessas ferramentas todas, eu não posso ter giz e caderno, eu tenho, mas não é só isso, não é só assim que se ensina.
P: Brigada, Marta, um bom restante de dia aí pra ti.
I3: Beijo grande e sucesso no teu trabalho.

C. Survey questionnaire

Introduction

Dear university instructor,
This survey is part of the procedures of an international study about the perception of university instructors concerning students' use of media devices in classrooms. The study has been developed for a master thesis at Technische Universität Ilmenau, in the Department of Empirical Research and Political Communication. As a university instructor, your opinion and experience is highly relevant to this study.

The questions of this survey can be answered in between 10 and 15 minutes. As it is an international study, the questionnaire is in English. The participation is anonymous and the results will be used exclusively for scientific purposes.

Thank you very much.

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Section 1. Instructor's profile

1. What is your area of teaching?
( ) Humanities (e.g. History, Arts, Literature, Philosophy, Religion)
( ) Social Sciences (e.g. Psychology, Anthropology, Economics)
( ) Natural Sciences (e.g. Biology, Chemistry, Physics)
( ) Formal Sciences (e.g. Mathematics, Logic, Statistics)
( ) Applied Sciences (Law, Business Administration, Architecture)
( ) Health Sciences (Medicine, Odontology, Nutrition)
( ) Technological Sciences (Informatics, Engineering,)
( ) Earth sciences (Agriculture, Forest Engineering,)
( ) Other: _____

2. Which media devices do you possess?
( ) Laptop
( ) Smartphone
( ) Tablet
( ) Netbook
( ) iPod

3. Please estimate the approximate time you spend daily in your media devices for the following purposes.
Please write number of hours. For 30 minutes, write 0.5 (hour).

a) work related activities (e-mails, preparing material for classes, searching information, Accessing scientific journals and magazines, etc): _____

b) private online use (social networks, chatting on instant message programs, playing games, watching videos, online shopping, etc): _____

Section 2. Presence of students' behavior

4. Do you see your students using laptops, smartphones, tablets or/and netbooks during your classes?
( ) Yes ( ) No, I do not see it happening. ( ) No, because I forbid students to use media devices in class.

Filter 1: **Fordidden behavior.** If respondent chose the option "No, because I forbid students to use media devices in class" in the previous question, the next question would be the following, then respondent would be directed straight to Section 6 towards the end of the questionnaire:

5. Why have you forbidden your students to use media devices in your classes?
Please state the main reasons that made you decide banning the use of media devices by students your classes.

Filter 2: **Absent behavior.** If respondent chose the option "No, I do not see it happening" in question 4, the respondent would be directed straight to Section 7 towards the end of the questionnaire.

Filter 3: Present behavior. If respondent chose the option "Yes" in question 4, the next question would be as follows:

Section 3. Perceived behavior

6. This survey is interested in your perception of students' use of media devices in classrooms in general, including laptops, netbooks, smartphones and tablets. But if from your perspective it is necessary to differentiate among these devices, you have the option to answer the questions based on your perception about students' use of one particular device rather than devices in general.
Please select one of the options below and consider only the scenario you will choose now when you answer all the following questions until the end of the questionnaire.

( ) I will refer to media devices in general
( ) I will refer only to laptops
( ) I will refer only to smartphones
( ) I will refer only to tablets

7. What percentage of the group of students do you estimate that use media devices during your classes?
( ) Less than 25% ( ) 25% - 50% ( ) 50% - 75% ( ) 75% - 100%

8. What percentage of the class time do you estimate your students spend using media devices?
( ) Less than 25% ( ) 25% - 50% ( ) 50% - 75% ( ) 75% - 100%

9. What percentage of time spent on media devices usage do you estimate students engage in personal related activities (e.g. social networks, instant chatting, playing games, etc.) during your classes?
( ) Less than 25% ( ) 25% - 50% ( ) 50% - 75% ( ) 75% - 100%

10. How much of your teaching activities do you approximately spend conducting each of the kinds of classes below?

	0 – 20%	20 – 40%	40% - 60%	60% - 80%	80 – 100%
Lecture (pure instruction)					
Group seminars (presentations given by students)					
Problem method (questions/exercises/problems posed to students to answer in class)					
Laboratory (practical activities)					
Other:					

Section 4. Ideas and opinions

11. Having in mind your students' use of media devices during class, please consider the implications it brings to the educational environment, and indicate your level of agreement with each of the aspects below.
Please consider the impact of the use of media devices by students on the kind of classes you teach most of the time (either lectures, seminars, or laboratory, etc.).

Students' use of media devices in class...

	1 - Strongly agree	2 - Agree	3 - Neither agree nor disagree	4 - Disagree	5 - Strongly disagree	6 - I do not know
... is relevant to prepare my students for their careers in the field I teach.						
... affects negatively students' ability to focus on and follow the activities developed in class.						
... derives from a kind of addiction that students have to media devices.						
... helps students learn in class.						
... collaborates for students to participate more actively in class by bringing new information.						
... impacts negatively students' results in assignments and other evaluative tasks.						
... helps my work as instructor by offering resources and tools to						

the teaching activity.						
... harms students' capacity to process the information worked in class.						
... makes it more difficult for me to control the learning environment.						
... helps show how the contents worked in class apply in reality.						
... is a good resource for students to search for further information in class, without depending on me.						
... gives more opportunities for instructor and students to interact, establish dialogue and exchange ideas.						
... makes my classes more efficient, in general.						
Students who overuse or misuse media in class usually lack maturity.						

Section 4. Feelings

12. Having in mind your students' use of media devices during class, please consider how you feel in your position as instructor concerning this situation, and indicate your level of agreement with each of the aspects below.
Please consider the impact of the use of media devices by students on the kind of classes you normally teach (either lectures, seminars, or laboratory, etc.).

Students' use of media devices in class...

	1 - Strongly agree	2 - Agree	3 - Neither agree nor disagree	4 - Disagree	5 - Strongly disagree	6 - I do not know
... gives me the feeling students are not interested in the class.						
... makes me feel I am failing somehow in getting their attention and engaging them.						
... brings the feeling my role and functions as instructor are not so relevant for the learning and development of students.						
... gives me the feeling that students are not in line with me in terms of goals and purposes of the class.						
... makes me feel						

threatened by the empowerment it gives to students to check, confirm and confront the information I give in class.						
... contributes positively to my motivation to teach.						
... disturbs my ability to focus on the planned activities and on the goals of the class.						
... irritates me for the dispersion it causes in students.						
... makes me feel more confident to conduct activities and come up with spontaneous tasks.						
... makes me feel bad.						

Section 5. Actions

13. Having in mind how you deal with your students media use behavior during your classes, please indicate how often you adopt each of the actions below.

	1 - Always	2 - Frequently	3 - Sometimes	4 - Rarely	5 - Never
I accept students' use of media devices in classrooms as something normal.					
I adapt my method of teaching to make my classes more interesting to win my students' attention.					
I incorporate the use of students' media devices in the activities of my classes.					
I ask students to use their devices to accomplish some activities in class.					
I move around the class to check what my students are doing on their devices.					
I establish rules for media devices use in my classes.					
I ask students to switch off their devices in some moments of the class.					
I call my students' attention verbally when they are using media not in line with the class activities.					
I forbid my students to use their devices in class.					

Section 6. Open remarks

14. If you would you like to leave some remark or comment about your perception, feelings and/or experience concerning students' media use and multitasking in class, you have the opportunity to do so in the space below.

Section 7. Closure questions

15. When were you born?
Please fill in only the year you were born (yyyy).

16. How long have you been teaching?
( ) Less than 2 years ( ) 2 – 5 years ( ) 5 -10 years ( ) 10 – 20 years ( ) more than 20 years

16. Gender
( ) Female ( ) Male

17. In which country are you?
Please write the name of the country where the educational institution you work for is situated.

Final page

If possible, kindly send the link of this survey to some of your fellow instructors:
http://www.unipark.de/uc/ik_tu_studenten/5cd8/

Thank you very much for you collaboration.

Declaration of autonomy

I hereby certify that the present work, master thesis "Students' media use and multitasking behavior in class: perspectives of university instructors about its impacts on the educational environment" is entirely my own work, that I have exercised reasonable care to ensure that the work is original, and does not to the best of my knowledge breach any law of copyright, and has not been taken from the work of others and to the extent that such work has been cited and acknowledged within the text of my work.

Ilmenau, November 4th 2014.

Priscila Berger